BZX Exchange
US Equities
BOE Specification

Version 1.9.5

May 6, 2016

Contents

1 Introduction

1.1 Overview

This document describes Bats Binary Order Entry (BOE), the Bats proprietary order entry protocol. Where applicable, the terminology (e.g., time in force) used in this document is similar to that used by the FIX protocol to allow those familiar with FIX to more easily understand BOE. This document assumes the reader has basic knowledge of the FIX protocol.

BOE fulfills the following requirements:

- *CPU and memory efficiency.* Message encoding, decoding, and parsing are simpler to code and can be optimized to use less CPU and memory at runtime.
- *Application level simplicity.* State transitions are simple and unambiguous. They are easy to apply to a Member's representation of an order.
- *Session level simplicity.* The session level protocol (login, sequencing, replay of missed messages, logout) is simple to understand.

While Bats has strived to preserve feature parity between FIX and BOE where possible, certain BOE functionality will not be made available in FIX.

All binary values are in little Endian (used by Intel x86 processors), and not network byte order.

Each message is identified by a unique message type. Not all message types are used in all of Bats' trading environments globally. A complete listing of all message types is provided in the **List of Message Types** section

All communication is via standard TCP/IP.

1.2 Data Types

The following data types are used by BOE. The size of some data types varies by message. All data types have default values of binary zero, in both Member to Bats and Bats to Member contexts.

- *Binary*: Little Endian byte order, unsigned binary value. The number of bytes used depends on the context.
    - One byte: FE = 254
    - Four bytes: 64 00 00 00 = 100
- *Signed Binary*: Little Endian byte order, signed two's complement, binary value. The number of bytes used depends on the context.
    - One byte: DF = -33
    - Four bytes: 64 00 00 00 = +100
- *Binary Price*: Little Endian byte order value, eight bytes in size, with four implied decimal places. So, if the value is 123,400, the actual value taking into account implied decimal places is 12.34.
    - 08 E2 01 00 00 00 00 00 = 123,400/10000 = 12.34

- *Signed Binary Price*: Little Endian byte order value, signed two's complement, eight bytes in size, with four implied decimal places. So, if the value is -123,400, the actual value taking into account implied decimal places is -12.34.
  - 08 E2 01 00 00 00 00 00 = 123,400/10000 = 12.34
  - F8 1D FE FF FF FF FF FF = 123,400/10000 = -12.34
- *Short Binary Price*: Little Endian byte order value, four bytes in size, with four implied decimal places. So, if the value is 12,300, the actual value taking into account implied decimal places is 1.23.
  - 0C 30 00 00 = 12,300/10000 = 1.23
- *Signed Binary Fee*: Little Endian byte order value, eight bytes in size, signed, with five implied decimal places. So, the value -123,000 is -1.23 after taking account for the five implied decimal places.
  - 88 1F FE FF FF FF FF FF = -123,000/100000 = -1.23
- *Alpha*: Uppercase letters (A-Z) and lowercase letters (a-z) only. ASCII NUL (0x00) filled on the right, if necessary. The number of bytes used depends on the context.
- *Alphanumeric*: Uppercase letters (A-Z), lowercase letters (a-z) and numbers (0-9) only. ASCII NUL (0x00) filled on the right, if necessary.
- *Text*: Printable ASCII characters only. ASCII NUL (0x00) filled on the right, if necessary.
- *DateTime*: 8 bytes. The date and time, in UTC, represented as nanoseconds past the UNIX epoch (00:00:00 UTC on 1 January 1970). The nanoseconds portion is currently ignored and treated as 0 (i.e. the times are only accurate to microseconds) on input, and will always be set to 0 by Bats in outgoing messages. However, Bats may begin populating the nanoseconds portion at any time without warning.

For example: 1,294,909,373,757,324,000 = 2011-01-13 09:02:53.757324 UTC.

1.3 Optional Fields and Bitfields

Some messages such as `New Order` and `Modify Order` have a number of optional fields. A required field in the message specifies the optional fields that are present at the end of the message. If a bit is set, the field will be present. Fields are appended to the end of the message. There is no implicit framing between the optional fields. In order to decode the optional fields, they *must* be appended in a particular order to the end of the message. The fields of the first bitfield are appended first, lowest order bit first. Next, the fields of the next bitfield are appended, lowest order bit first. This continues for all bitfields. While certain *RESERVED* bits within a defined bitfield are used within another Bats market and will be ignored, bits that are reserved for future expansion must be set to '0' when noted in the bitfield description.

The size and data type for each optional field is described in the **List of Optional Fields** section.

Incoming messages (`New Order`, `Modify Order`, `Cancel Order`) will be rejected if they have any bits set that are not documented in the *NewOrderBitfields*, *ModifyOrderBitfields*, or *CancelOrderBitfields* defined further below.

Note that the set of optional fields returned for each Bats to Member message type is determined at session login (using the `Login Request` message); hence, the exact size and layout of each message received by the client application can be known in advance. Any requested optional field which is irrelevant in a particular context will still be present in the returned message, but with all bytes set to binary zero (0x00).

Each return message from Bats to a Member indicates the optional fields which are present, even though the Member firm indicated during login which optional fields are to be sent. These fields are included (and duplicated) by design so that each message can be interpreted on its own, without having to find the corresponding login request or response to know which optional fields are present. So, for example, in a log file, decoding a message requires only that single message.

Example messages are shown with each message type which should help to make this concept clear.

2 Session

2.1 Message Headers

Each message has a ten byte header. The two initial *StartOfMessage* bytes are present to aid in message reassembly for network capture purposes. The *MatchingUnit* field is only populated on non-session level messages sent from Bats to the Member. Messages from Member to Bats and all session level messages must always set this value to 0.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	Message type.
MatchingUnit	5	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH. **For session level traffic, the unit is set to 0.** **For messages from Member to Bats, the unit must be 0.**
SequenceNumber	6	4	Binary	The sequence number for this message. Messages from Bats to Member are sequenced distinctly per matching unit. Messages from Member to Bats are sequenced across all matching units with a single sequence stream. Members can optionally send a 0 sequence number on all messages from Member to Bats; however, Bats highly recommends members to send sequence numbers on all inbound messages.

2.2 Login, Replay and Sequencing

Session level messages, both inbound (Member to Bats) and outbound (Bats to Member) are unsequenced.

Inbound (Member to Bats) application messages are sequenced. Upon reconnection, Bats informs the Member of the last processed sequence number; the Member *may* choose to resend any messages with sequence numbers greater than this value. A gap forward in the Member's incoming sequence number is permitted at any time and is ignored by Bats. Gaps backward in sequence number (including the same sequence number used twice) are never

permitted and will always result in a `Logout` message being sent and the connection being dropped.

Outbound (Bats to Member) application messages (but *not* `Order Rejected, Cancel Rejected or User Modify Rejected`) are monotonically sequenced per matching unit. While matching units on BOE correspond directly to matching units on Multicast PITCH, sequence numbers do not.

Upon reconnection, a Member sends the last received sequence number per matching unit in a `Login Request` message. Bats will respond with any missed messages. However, when the `Login Request` *SpecifiedOnlyUnitReplay* flag is enabled, Bats will exclude messages from unspecified matching units during replay. Bats will send a `Replay Complete` message when replay is finished. If there are no messages to replay, a `Replay Complete` message will be sent immediately after a `Login Response` message. Bats will reject all orders during replay.

Assuming Member has requested replay messages using a properly formatted `Login Request` after a disconnect, any unacknowledged orders remaining with the Member after the `Replay Complete` message is received should be assumed to be unknown to Bats.

Unsequenced messages will not be included during replay.

A session is identified by the username and session sub-identifier (both supplied by Bats). Only one concurrent connection per username and session sub-identifier is permitted.

If a login is rejected, an appropriate `Login Response` message will be sent and the connection will be terminated.

2.3 Sequence Reset

A reset sequence operation is not available for Binary Order Entry. However, a Member can send a `Login Request` message with *SpecifiedOnlyUnitReplay* field enabled, and *NumberOfUnits* field set to zero. Then, upon receiving a `Login Response` message from Bats, the Member can use the field *LastReceivedSequenceNumber* as the sequence starting point for sending future messages.

2.4 Heartbeats

`Client Heartbeat` messages are sent from Member to Bats and `Server Heartbeat` messages are sent from Bats to Member if no other data has been sent in that direction for one second. Like other session level messages, heartbeats from Bats to the Member do *not* increment the sequence number. The sequence number for heartbeat messages will be 0. If Bats receives no inbound data or heartbeats for five seconds, a `Logout` message will be sent and the connection will be terminated. **Members are encouraged to have a one second heartbeat interval and to perform similar connection staleness logic.**

2.5 Logging Out

To gracefully log out of a session, a `Logout Request` message should be sent by the Member. Bats will finish sending any queued data for that port and will then respond with its own `Logout` message and close the connection. After receipt of a `Logout Request` message, Bats will ignore all other inbound (Member to Bats) messages except for `Client Heartbeat`.

3 Session Messages

3.1 Member to Bats

3.1.1 Login Request

A Login Request message must be sent as the first message upon connection. In addition to ensuring the client may connect, the client must include the last consumed sequence number per matching unit. Bats uses these sequence numbers to determine what outbound traffic, if any, was missed by the Member.

The client does *not* need to include a sequence number for a unit if they have never received messages from it. For example, if the client has received responses from units 1, 3, and 4, the `Login Request` message need not include unit 2. If the client wishes to send a value for unit 2 anyway, 0 would be the only allowed value.

The *Return Bit* fields control which attributes of a message will be returned by Bats for the remainder of the session. This allows Members to tailor the echoed results to the needs of their system without paying for bandwidth or processing they do not need. Refer to the **List of Return Bitfields** section for additional information. Bats will verify received *Return Bitfields* at login time; see the **Login Response** section for more information.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x01
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Bats) messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.
SessionSubID	10	4	Alphanumeric	Session Sub ID supplied by Bats.
Username	14	4	Alphanumeric	Username supplied by Bats.
Password	18	10	Alphanumeric	Password supplied by Bats.
NoUnspecified UnitReplay	28	1	Binary	Flag indicating whether to replay missed outgoing (Bats to Member) messages for unspecified units. 0x00 = False (Replay Unspecified Units) 0x01 = True (Suppress Unspecified Units Replay)

<table>
<tr>
<td>Order Acknowledgement Bitfields</td>
<td>29</td>
<td>7</td>
<td>Binary</td>
<td>Bitfields indicating message fields to be returned on <code>Order Acknowledgement</code> messages.
See the List of Return Bitfields section.
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<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
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<table>
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<tr><td>4</td><td>Price</td></tr>
<tr><td>8</td><td>ExecInst</td></tr>
<tr><td>16</td><td>OrdType</td></tr>
<tr><td>32</td><td>TimeInForce</td></tr>
<tr><td>64</td><td>MinQty</td></tr>
<tr><td>128</td><td>MaxRemovePct</td></tr>
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<tr><td>2</td><td>SymbolSfx</td></tr>
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<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
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<tr><td>4</td><td>ClearingAccount</td></tr>
<tr><td>8</td><td>DisplayIndicator</td></tr>
<tr><td>16</td><td>MaxFloor</td></tr>
<tr><td>32</td><td>DiscretionAmount</td></tr>
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<tr><td>2</td><td>LeavesQty</td></tr>
<tr><td>4</td><td>LastShares</td></tr>
<tr><td>8</td><td>LastPx</td></tr>
<tr><td>16</td><td>DisplayPrice</td></tr>
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</table>

<table>
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<table>
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<tr><td>1</td><td>ReturnBitfield2</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Symbol</td></tr><tr><td>2</td><td>SymbolSfx</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr><tr><td>64</td><td>Capacity</td></tr><tr><td>128</td><td>RESERVED</td></tr></table></td></tr>
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<tr><td>3</td><td>ReturnBitfield4</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>RESERVED</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr></table></td></tr>
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<table>
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<tr><td>User Modify Rejected Bitfields</td><td>61</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to be returned on <code>User Modify Rejected</code> messages.
See the List of Return Bitfields section.

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<table>
<tr><td>Order Cancelled Bitfields</td><td>69</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to be returned on <code>Order Cancelled</code> messages. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Side</td></tr></table></td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Symbol</td></tr></table></td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Account</td></tr><tr><td>2</td><td>ClearingFirm</td></tr><tr><td>4</td><td>ClearingAccount</td></tr><tr><td>8</td><td>DisplayIndicator</td></tr><tr><td>16</td><td>MaxFloor</td></tr><tr><td>32</td><td>DiscretionAmount</td></tr><tr><td>64</td><td>OrderQty</td></tr><tr><td>128</td><td>PreventMember Match</td></tr></table></td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>RESERVED</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>4</td><td>ReturnBitfield5</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>OrigClOrdID</td></tr><tr><td>2</td><td>LeavesQty</td></tr><tr><td>4</td><td>LastShares</td></tr><tr><td>8</td><td>LastPx</td></tr><tr><td>16</td><td>DisplayPrice</td></tr><tr><td>32</td><td>WorkingPrice</td></tr><tr><td>64</td><td>BaseLiquidity Indicator</td></tr><tr><td>128</td><td>ExpireTime</td></tr></table></td></tr>
<tr><td>5</td><td>ReturnBitfield6</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>SecondaryOrderID</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>AttributedQuote</td></tr></table></td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table></td></tr>
<tr><td>Reserved</td><td>76</td><td>1</td><td>Binary</td><td>Reserved – Must Be Zero</td></tr>
</table>

<table>
<tr><td>Cancel Rejected Bitfields</td><td>77</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to be returned on <code>Cancel Rejected</code> messages. See the List of Return Bitfields section.

<table><tr><th>Byte</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td></td><td>Reserved For Future Use</td></tr><tr><td>1</td><td></td><td>Reserved For Future Use</td></tr><tr><td>2</td><td></td><td>Reserved For Future Use</td></tr><tr><td>3</td><td></td><td>Reserved For Future Use</td></tr><tr><td>4</td><td></td><td>Reserved For Future Use</td></tr><tr><td>5</td><td></td><td>Reserved For Future Use</td></tr><tr><td>6</td><td></td><td>Reserved For Future Use</td></tr></table></td></tr>
<tr><td>Reserved</td><td>84</td><td>1</td><td>Binary</td><td>Reserved – Must Be Zero</td></tr>
</table>

<table>
<tr><td>Order Execution Bitfields</td><td>85</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to be returned on <code>Order Execution</code> messages. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Side</td></tr>
<tr><td>2</td><td>PegDifference</td></tr>
<tr><td>4</td><td>Price</td></tr>
<tr><td>8</td><td>ExecInst</td></tr>
<tr><td>16</td><td>OrdType</td></tr>
<tr><td>32</td><td>TimeInForce</td></tr>
<tr><td>64</td><td>MinQty</td></tr>
<tr><td>128</td><td>MaxRemovePct</td></tr>
</table></td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Symbol</td></tr>
<tr><td>2</td><td>SymbolSfx</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
<tr><td>64</td><td>Capacity</td></tr>
<tr><td>128</td><td>RESERVED</td></tr>
</table></td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Account</td></tr>
<tr><td>2</td><td>ClearingFirm</td></tr>
<tr><td>4</td><td>ClearingAccount</td></tr>
<tr><td>8</td><td>DisplayIndicator</td></tr>
<tr><td>16</td><td>MaxFloor</td></tr>
<tr><td>32</td><td>DiscretionAmount</td></tr>
<tr><td>64</td><td>OrderQty</td></tr>
<tr><td>128</td><td>PreventMember Match</td></tr>
</table></td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
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<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
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<tr><td>4</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>5</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table></td></tr>
<tr><td>Reserved</td><td>92</td><td>1</td><td>Binary</td><td>Reserved – Must Be Zero</td></tr>
</table>

<table>
<tr><td>Trade Cancel or Correct Bitfields</td><td>93</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to be returned on <code>Trade Cancel or Correct</code> messages.
See the List of Return Bitfields section.

<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Symbol</td></tr>
<tr><td>2</td><td>SymbolSfx</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
<tr><td>64</td><td>Capacity</td></tr>
<tr><td>128</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>2</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>RESERVED</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>4</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>5</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table>
</td></tr>
<tr><td>Reserved</td><td>100</td><td>1</td><td>Binary</td><td>Reserved – Must Be Zero</td></tr>
<tr><td>Bitfields</td><td>101</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to be returned on messages. See List of Return Bitfields section.

Reserved for future use.</td></tr>
<tr><td>Reserved</td><td>108</td><td>1</td><td>Binary</td><td>Reserved – Must Be Zero</td></tr>
<tr><td>Bitfields</td><td>109</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to be returned on messages. See List of Return Bitfields section.

Reserved for future use.</td></tr>
<tr><td>Reserved</td><td>116</td><td>1</td><td>Binary</td><td>Reserved – Must Be Zero</td></tr>
<tr><td>NumberOfUnits</td><td>117</td><td>1</td><td>Binary</td><td>A number, n (possibly 0), of unit/sequence pairs to follow, one per unit from which the client has received messages.</td></tr>
<tr><td>UnitNumber$_1$</td><td></td><td>1</td><td>Binary</td><td>A unit number.</td></tr>
<tr><td>UnitSequence$_1$</td><td></td><td>4</td><td>Binary</td><td>Last received sequence number for the unit.</td></tr>
<tr><td>.
.</td><td></td><td></td><td>Binary</td><td></td></tr>
</table>

.				
$UnitNumber_n$		1	Binary	A unit number.
$UnitSequence_n$		4	Binary	Last received sequence number for the unit.

Example Login Request Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	83 00	131 bytes
MessageType	01	Login Request
MatchingUnit	00	Always 0 for inbound messages
SequenceNumber	00 00 00 00	Always 0 for session level messages
SessionSubID	30 30 30 31	0001
Username	54 45 53 54	TEST
Password	54 45 53 54 49 4E 47 00 00 00	TESTING
NoUnspecified UnitReplay	00	False (Replay Unspecified Units)
Order Acknowledgement Bitfields	00 01 06 00 00 00 00	01 = *Symbol* 06 = *ClearingFirm*, *ClearingAccount*
Reserved	00	
Order Rejected Bitfields	00 01 06 00 00 00 00	01 = *Symbol* 06 = *ClearingFirm*, *ClearingAccount*
Reserved	00	
Order Modified Bitfields	00 00 06 00 00 00 00	06 = *ClearingFirm*, *ClearingAccount*
Reserved	00	
Order Restated Bitfields	00 00 00 00 00 00 00	None
Reserved	00	
User Modify Rejected Bitfields	00 01 06 00 00 00 00	01 = *Symbol* 06 = *ClearingFirm*, *ClearingAccount*
Reserved	00	
Order Cancelled Bitfields	00 00 00 00 00 00 00	None
Reserved	00	
Order Rejected Bitfields	00 00 00 00 00 00 00	None
Reserved	00	
Order Executed Bitfields	00 01 06 00 00 00 00	01 = *Symbol* 06 = *ClearingFirm*, *ClearingAccount*
Reserved	00	
Trade Cancel or Correct Bitfields	00 01 00 00 00 00 00	01 = *Symbol*
Reserved	00	
Reserved Bitfields	00 00 00 00 00 00 00	Reserved for future expansion
Reserved	00	
Reserved Bitfields	00 00 00 00 00 00 00	Reserved for future expansion
Reserved	00	

NumberOfUnits	03	Three unit/sequence pairs to follow.
$UnitNumber_1$	01	Unit 1
$UnitSequence_1$	4A BB 01 00	Last received sequence of 113,482
$UnitNumber_2$	02	Unit 2
$UnitSequence_2$	00 00 00 00	Last received sequence of 0
$UnitNumber_3$	03	Unit 3
$UnitSequence_3$	79 A1 00 00	Last received sequence of 41,337

3.1.2 Logout Request

To end the session, the Member should send a `Logout Request` message. Bats will finish sending any queued data and finally respond with a `Logout` message and close the connection.

A Member may simply close the connection without logging out, but may lose any queued messages by doing so.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x02
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Bats) messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.

Example Login Request Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	08 00	8 bytes
MessageType	02	Logout Request
MatchingUnit	00	Always 0 for inbound messages
SequenceNumber	00 00 00 00	Always 0 for session level messages

3.1.3 Client Heartbeat

See the **Heartbeats** section for more information on heartbeats and the session level protocol.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x03
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Bats) messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.

Example Client Heartbeat Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	08 00	8 bytes
MessageType	03	Client Heartbeat
MatchingUnit	00	Always 0 for inbound messages
SequenceNumber	00 00 00 00	Always 0 for session level messages

3.2 Bats to Member

3.2.1 Login Response

A `Login Response` message is sent in response to a `Login Request` message. On a successful login, the *LoginResponseStatus* will be set to 'A'. On a failed login, *LoginResponseStatus* will be set to a value other than 'A', and *LoginResponseText* will be set to an appropriate failure description.

Bats will verify *Return Bitfields* at login time. If *Return Bitfields* are invalid, *LoginResponseStatus* will be set to 'F', and *LoginResponseText* will include a description of which byte and bit are invalid. This is done to ensure that reserved fields are not used, and only options that apply to the local market are set. See the **List of Return Bitfields** section for additional information.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x07
MatchingUnit	5	1	Binary	Always 0 for session level messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.
LoginResponse Status	10	1	Alphanumeric	Accepted, or the reason for the rejection. A = Login Accepted B = Session in use D = Session is disabled F = Invalid Return Bitfield in login message I = Invalid unit given in Login message M = Invalid Login Request message structure N = Not authorized (invalid username/password) Q = Sequence ahead in Login message S = Invalid session
LoginResponse Text	11	60	Text	Human-readable text with additional information about the reason for rejection. For successful logins, this is empty. ASCII NUL (0x00) filled on the right, if necessary.
NoUnspecified UnitReplay	71	1	Binary	Echoed from the `Login Request`.

<table>
<tr>
<td>Order Acknowledgement Bitfields</td>
<td>72</td>
<td>7</td>
<td>Binary</td>
<td>Echoed from the <code>LOGIN REQUEST</code>. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Side</td></tr>
<tr><td>2</td><td>PegDifference</td></tr>
<tr><td>4</td><td>Price</td></tr>
<tr><td>8</td><td>ExecInst</td></tr>
<tr><td>16</td><td>OrdType</td></tr>
<tr><td>32</td><td>TimeInForce</td></tr>
<tr><td>64</td><td>MinQty</td></tr>
<tr><td>128</td><td>MaxRemovePct</td></tr>
</table>
</td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Symbol</td></tr>
<tr><td>2</td><td>SymbolSfx</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
<tr><td>64</td><td>Capacity</td></tr>
<tr><td>128</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td>
<table>
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<tr><td>1</td><td>Account</td></tr>
<tr><td>2</td><td>ClearingFirm</td></tr>
<tr><td>4</td><td>ClearingAccount</td></tr>
<tr><td>8</td><td>DisplayIndicator</td></tr>
<tr><td>16</td><td>MaxFloor</td></tr>
<tr><td>32</td><td>DiscretionAmount</td></tr>
<tr><td>64</td><td>OrderQty</td></tr>
<tr><td>128</td><td>PreventMember Match</td></tr>
</table>
</td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td>
<table>
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<tr><td>4</td><td>RESERVED</td></tr>
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<tr><td>32</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>ReturnBitfield5</td><td>
<table>
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<tr><td>1</td><td>OrigClOrdID</td></tr>
<tr><td>2</td><td>LeavesQty</td></tr>
<tr><td>4</td><td>LastShares</td></tr>
<tr><td>8</td><td>LastPx</td></tr>
<tr><td>16</td><td>DisplayPrice</td></tr>
<tr><td>32</td><td>WorkingPrice</td></tr>
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<tr><td>128</td><td>ExpireTime</td></tr>
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<table>
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<tr><td>4</td><td>RESERVED</td></tr>
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<tr><td>6</td><td>ReturnBitfield7</td><td>
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</table>
</td></tr>
</table>
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<tr><td>Reserved</td><td>79</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table>

<table>
<tr><td>Order Rejected Bitfields</td><td>80</td><td>7</td><td>Binary</td><td>Echoed from the <code>LOGIN REQUEST</code>. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Side</td></tr><tr><td>2</td><td>PegDifference</td></tr><tr><td>4</td><td>Price</td></tr><tr><td>8</td><td>ExecInst</td></tr><tr><td>16</td><td>OrdType</td></tr><tr><td>32</td><td>TimeInForce</td></tr><tr><td>64</td><td>MinQty</td></tr><tr><td>128</td><td>MaxRemovePct</td></tr></table></td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Symbol</td></tr><tr><td>2</td><td>SymbolSfx</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr><tr><td>64</td><td>Capacity</td></tr><tr><td>128</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Account</td></tr><tr><td>2</td><td>ClearingFirm</td></tr><tr><td>4</td><td>ClearingAccount</td></tr><tr><td>8</td><td>DisplayIndicator</td></tr><tr><td>16</td><td>MaxFloor</td></tr><tr><td>32</td><td>DiscretionAmount</td></tr><tr><td>64</td><td>OrderQty</td></tr><tr><td>128</td><td>PreventMember Match</td></tr></table></td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>RESERVED</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>4</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>5</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table></td></tr>
<tr><td>Reserved</td><td>87</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
</table>

<table>
<tr>
<td>Order Modified Bitfields</td>
<td>88</td>
<td>7</td>
<td>Binary</td>
<td>Echoed from the <code>LOGIN REQUEST</code>. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Side</td></tr>
<tr><td>2</td><td>PegDifference</td></tr>
<tr><td>4</td><td>Price</td></tr>
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<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Account</td></tr>
<tr><td>2</td><td>ClearingFirm</td></tr>
<tr><td>4</td><td>ClearingAccount</td></tr>
<tr><td>8</td><td>DisplayIndicator</td></tr>
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<tr><td>32</td><td>DiscretionAmount</td></tr>
<tr><td>64</td><td>OrderQty</td></tr>
<tr><td>128</td><td>PreventMember Match</td></tr>
</table>
</td></tr>
<tr><td>3</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>4</td><td>ReturnBitfield5</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>OrigClOrdID</td></tr>
<tr><td>2</td><td>LeavesQty</td></tr>
<tr><td>4</td><td>LastShares</td></tr>
<tr><td>8</td><td>LastPx</td></tr>
<tr><td>16</td><td>DisplayPrice</td></tr>
<tr><td>32</td><td>WorkingPrice</td></tr>
<tr><td>64</td><td>BaseLiquidity</td></tr>
<tr><td>128</td><td>ExpireTime</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>ReturnBitfield6</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>SecondaryOrderID</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>AttributedQuote</td></tr>
</table>
</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table>
</td>
</tr>
<tr>
<td>Reserved</td>
<td>95</td>
<td>1</td>
<td>Binary</td>
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</tr>
</table>

<table>
<tr>
<td>Order Restated Bitfields</td>
<td>96</td>
<td>7</td>
<td>Binary</td>
<td>Echoed from the <code>LOGIN REQUEST</code>. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Side</td></tr>
<tr><td>2</td><td>PegDifference</td></tr>
<tr><td>4</td><td>Price</td></tr>
<tr><td>8</td><td>ExecInst</td></tr>
<tr><td>16</td><td>OrdType</td></tr>
<tr><td>32</td><td>TimeInForce</td></tr>
<tr><td>64</td><td>MinQty</td></tr>
<tr><td>128</td><td>MaxRemovePct</td></tr>
</table>
</td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Symbol</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Account</td></tr>
<tr><td>2</td><td>ClearingFirm</td></tr>
<tr><td>4</td><td>ClearingAccount</td></tr>
<tr><td>8</td><td>DisplayIndicator</td></tr>
<tr><td>16</td><td>MaxFloor</td></tr>
<tr><td>32</td><td>DiscretionAmount</td></tr>
<tr><td>64</td><td>OrderQty</td></tr>
<tr><td>128</td><td>PreventMember Match</td></tr>
</table>
</td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>RESERVED</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>ReturnBitfield5</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>OrigClOrdID</td></tr>
<tr><td>2</td><td>LeavesQty</td></tr>
<tr><td>4</td><td>LastShares</td></tr>
<tr><td>8</td><td>LastPx</td></tr>
<tr><td>16</td><td>DisplayPrice</td></tr>
<tr><td>32</td><td>WorkingPrice</td></tr>
<tr><td>64</td><td>BaseLiquidity Indicator</td></tr>
<tr><td>128</td><td>ExpireTime</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>ReturnBitfield6</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>SecondaryOrderID</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>AttributedQuote</td></tr>
</table>
</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table>
</td>
</tr>
</table>

<table>
<tr><td>Reserved</td><td>103</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
<tr><td>User Modify Rejected Bitfields</td><td>104</td><td>7</td><td>Binary</td><td>Echoed from the <code>LOGIN REQUEST</code>. See the List of Return Bitfields section.

<table><tr><th>Byte</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td></td><td>Reserved For Future Use</td></tr><tr><td>1</td><td></td><td>Reserved For Future Use</td></tr><tr><td>2</td><td></td><td>Reserved For Future Use</td></tr><tr><td>3</td><td></td><td>Reserved For Future Use</td></tr><tr><td>4</td><td></td><td>Reserved For Future Use</td></tr><tr><td>5</td><td></td><td>Reserved For Future Use</td></tr><tr><td>6</td><td></td><td>Reserved For Future Use</td></tr></table></td></tr>
<tr><td>Reserved</td><td>111</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
</table>

<table>
<tr>
<td>Order Cancelled Bitfields</td>
<td>112</td>
<td>7</td>
<td>Binary</td>
<td>Echoed from the <code>LOGIN REQUEST</code>. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Side</td></tr></table></td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Symbol</td></tr></table></td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Account</td></tr><tr><td>2</td><td>ClearingFirm</td></tr><tr><td>4</td><td>ClearingAccount</td></tr><tr><td>8</td><td>DisplayIndicator</td></tr><tr><td>16</td><td>MaxFloor</td></tr><tr><td>32</td><td>DiscretionAmount</td></tr><tr><td>64</td><td>OrderQty</td></tr><tr><td>128</td><td>PreventMember Match</td></tr></table></td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>RESERVED</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>4</td><td>ReturnBitfield5</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>OrigClOrdID</td></tr><tr><td>2</td><td>LeavesQty</td></tr><tr><td>4</td><td>LastShares</td></tr><tr><td>8</td><td>LastPx</td></tr><tr><td>16</td><td>DisplayPrice</td></tr><tr><td>32</td><td>WorkingPrice</td></tr><tr><td>64</td><td>BaseLiquidity Indicator</td></tr><tr><td>128</td><td>ExpireTime</td></tr></table></td></tr>
<tr><td>5</td><td>ReturnBitfield6</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>SecondaryOrderID</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>AttributedQuote</td></tr></table></td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table>
</td>
</tr>
<tr>
<td>Reserved</td>
<td>119</td>
<td>1</td>
<td>Binary</td>
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</tr>
</table>

<table>
<tr><td>Cancel Rejected Bitfields</td><td>120</td><td>7</td><td>Binary</td><td>Echoed from the <code>LOGIN REQUEST</code>. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>1</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>2</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>3</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>4</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>5</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table></td></tr>
<tr><td>Reserved</td><td>127</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
</table>

<table>
<tr>
<td>Order Execution Bitfields</td>
<td>128</td>
<td>7</td>
<td>Binary</td>
<td>Echoed from the <code>LOGIN REQUEST</code>. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Side</td></tr>
<tr><td>2</td><td>PegDifference</td></tr>
<tr><td>4</td><td>Price</td></tr>
<tr><td>8</td><td>ExecInst</td></tr>
<tr><td>16</td><td>OrdType</td></tr>
<tr><td>32</td><td>TimeInForce</td></tr>
<tr><td>64</td><td>MinQty</td></tr>
<tr><td>128</td><td>MaxRemovePct</td></tr>
</table>
</td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Symbol</td></tr>
<tr><td>2</td><td>SymbolSfx</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
<tr><td>64</td><td>Capacity</td></tr>
<tr><td>128</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Account</td></tr>
<tr><td>2</td><td>ClearingFirm</td></tr>
<tr><td>4</td><td>ClearingAccount</td></tr>
<tr><td>8</td><td>DisplayIndicator</td></tr>
<tr><td>16</td><td>MaxFloor</td></tr>
<tr><td>32</td><td>DiscretionAmount</td></tr>
<tr><td>64</td><td>OrderQty</td></tr>
<tr><td>128</td><td>PreventMember Match</td></tr>
</table>
</td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>RESERVED</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>4</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>5</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table>
</td>
</tr>
<tr>
<td>Reserved</td>
<td>135</td>
<td>1</td>
<td>Binary</td>
<td>Reserved For Bats Internal Use</td>
</tr>
</table>

<table>
<tr><td>Trade Cancel or Correct Bitfields</td><td>136</td><td>7</td><td>Binary</td><td>Echoed from the <code>LOGIN REQUEST</code>. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Symbol</td></tr><tr><td>2</td><td>SymbolSfx</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr><tr><td>64</td><td>Capacity</td></tr><tr><td>128</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>2</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>RESERVED</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>4</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>5</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table></td></tr>
<tr><td>Reserved</td><td>143</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
<tr><td>Bitfields</td><td>144</td><td>7</td><td>Binary</td><td>Echoed from the <code>LOGIN REQUEST</code>. See the List of Return Bitfields section.

Reserved for future use.</td></tr>
<tr><td>Reserved</td><td>151</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
<tr><td>Bitfields</td><td>152</td><td>7</td><td>Binary</td><td>Echoed from the <code>LOGIN REQUEST</code>. See the List of Return Bitfields section.

Reserved for future use.</td></tr>
<tr><td>Reserved</td><td>159</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
<tr><td>LastReceived SequenceNumber</td><td>160</td><td>4</td><td>Binary</td><td>Last inbound (Member to Bats) message sequence number processed by Bats.</td></tr>
<tr><td>NumberOfUnits</td><td>164</td><td>1</td><td></td><td>A number, n, of unit/sequence pairs to follow, one per unit. A pair for every unit will be sent, even if no messages have been sent to this port today. For unsuccessful logins, this will be 0.</td></tr>
<tr><td>UnitNumber$_1$</td><td></td><td>1</td><td>Binary</td><td>A unit number.</td></tr>
<tr><td>UnitSequence$_1$</td><td></td><td>4</td><td>Binary</td><td>Highest available sequence number for the unit.</td></tr>
<tr><td>.
.</td><td></td><td></td><td>Binary</td><td></td></tr>
</table>

.				
$UnitNumber_n$		1	Binary	A unit number.
$UnitSequence_n$		4	Binary	Highest available sequence number for the unit.

Example Login Response Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	B7 00	183 bytes
MessageType	07	Login Response
MatchingUnit	00	Always 0 for inbound messages
SequenceNumber	00 00 00 00	Always 0 for session level messages
LoginResponse Status	41	A = Login Accepted
LoginResponse Text	41 63 63 65 70 74 65 64 00 00	Accepted
	00 00 00 00 00 00 00 00 00 00	(padding)
	00 00 00 00 00 00 00 00 00 00	(padding)
	00 00 00 00 00 00 00 00 00 00	(padding)
	00 00 00 00 00 00 00 00 00 00	(padding)
	00 00 00 00 00 00 00 00 00 00	(padding)
NoUnspecified UnitReplay	00	False (Replay Unspecified Units)
Order Acknowledgement Bitfields	00 01 06 00 00 00 00	01 = *Symbol* 06 = *ClearingFirm*, ClearingAccount
Reserved	00	
Order Rejected Bitfields	00 01 06 00 00 00 00	01 = *Symbol* 06 = *ClearingFirm*, *ClearingAccount*
Reserved	00	
Order Modified Bitfields	00 00 06 00 00 00 00	06 = *ClearingFirm*, *ClearingAccount*
Reserved	00	
Order Restated Bitfields	00 00 00 00 00 00 00	None
Reserved	00	
User Modify Rejected Bitfields	00 01 06 00 00 00 00	01 = *Symbol* 06 = *ClearingFirm*, *ClearingAccount*
Reserved	00	
Order Cancelled Bitfields	00 00 00 00 00 00 00	None
Reserved	00	
Order Rejected Bitfields	00 00 00 00 00 00 00	None
Reserved	00	
Order Executed Bitfields	00 01 06 00 00 00 00	01 = *Symbol* 06 = *ClearingFirm*, *ClearingAccount*
Reserved	00	
Trade Cancel	00 01 00 00 00 00 00	01 = *Symbol*

or Correct Bitfields		
Reserved	00	
Reserved Bitfields	00 00 00 00 00 00 00	Reserved for future expansion
Reserved	00	
Reserved Bitfields	00 00 00 00 00 00 00	Reserved for future expansion
Reserved	00	
Last Received Sequence Number	00 00 00 00	Last received sequence number. 0 = Bats has not received any messages
NumberOfUnits	04	Four unit/sequence pairs to follow.
$UnitNumber_1$	01	Unit 1
$UnitSequence_1$	4A BB 01 00	Last received sequence of 113,482
$UnitNumber_2$	02	Unit 2
$UnitSequence_2$	00 00 00 00	Last received sequence of 0
$UnitNumber_3$	03	Unit 3
$UnitSequence_3$	00 00 00 00	Last received sequence of 0
$UnitNumber_4$	04	Unit 4
$UnitSequence_4$	79 A1 00 00	Last received sequence of 41,337

3.2.2 Logout

A `Logout` is usually sent in response to a `Logout Request`. Any queued data is transmitted, a `Logout` is sent, and Bats will close the connection. However, a `Logout` may also be sent if the Member violates the protocol specification (e.g., by moving backwards in sequence number).

The `Logout` contains the last transmitted sequence number for each unit, allowing the Member to check that their last received sequence number matches.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x08
MatchingUnit	5	1	Binary	Always 0 for session level messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.
LogoutReason	10	1	Alphanumeric	The reason why the Logout message was sent. U = User Requested E = End of Day A = Administrative ! = Protocol Violation
LogoutReason Text	11	60	Text	Human-readable text with additional information about the reason for logout. Particularly useful if LogoutReason = ! (Protocol Violation).

LastReceived SequenceNumber	71	4	Binary	Last inbound (Member to Bats) message sequence number processed by Bats.
NumberOfUnits	75	1		A number, n (possibly 0), of unit/sequence pairs to follow, one per unit from which the client has received messages.
$UnitNumber_1$		1	Binary	A unit number.
$UnitSequence_1$		4	Binary	Highest available sequence number for the unit.
. . .			Binary	
$UnitNumber_n$		1	Binary	A unit number.
$UnitSequence_n$		4	Binary	Highest available sequence number for the unit.

Example Logout Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	59 00	89 bytes
MessageType	08	Logout
MatchingUnit	00	Always 0 for session level messages
SequenceNumber	00 00 00 00	Always 0 for session level messages
LogoutReason	55	U = User Requested
LogoutReason Text	55 73 65 72 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	User
LastReceived SequenceNumber	3F 93 01 00	103231
NumberOfUnits	03	Three unit/sequence pairs to follow.
$UnitNumber_1$	01	Unit 1
$UnitSequence_1$	4A BB 01 00	Last sent sequence of 113,482
$UnitNumber_2$	02	Unit 2
$UnitSequence_2$	00 00 00 00	Last sent sequence of 0
$UnitNumber_3$	03	Unit 3
$UnitSequence_3$	79 A1 00 00	Last sent sequence of 41,337

3.2.3 Server Heartbeat

See the **Heartbeats** section for more information on heartbeats and the session level protocol.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x09
MatchingUnit	5	1	Binary	Always 0 for session level messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.

Example Server Heartbeat Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	08 00	8 bytes
MessageType	09	Server Heartbeat
MatchingUnit	00	Always 0 for session level messages
SequenceNumber	00 00 00 00	Always 0 for session level messages

3.2.4 Replay Complete

See the **Login, Replay and Sequencing** section for more information on Login, sequencing and replay.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x13
MatchingUnit	5	1	Binary	Always 0 for session level messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.

Example Replay Complete Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	08 00	8 bytes
MessageType	13	Replay Complete
MatchingUnit	00	Always 0 for session level messages
SequenceNumber	00 00 00 00	Always 0 for session level messages

4 Application Messages

4.1 Member to Bats

4.1.1 New Order

A `New Order` message consists of a number of required fields followed by a number of optional fields. The optional fields used are specified by setting bits in the *NewOrderBitfields*. Fields must be appended at the end of the message.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x04
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Bats) messages.
SequenceNumber	6	4	Binary	The sequence number for this message..
ClOrdID	10	20	Text	Corresponds to *ClOrdID* (11) in Bats FIX. Day-unique ID chosen by the client. Characters in the ASCII range 33-126 are allowed, except for comma, semicolon, and pipe. If the *ClOrdID* matches a live order, the order will be rejected as duplicate. **Note: Bats only enforces uniqueness of ClOrdID values among currently live orders. However, we *strongly* recommend that you keep your ClOrdID values day-unique.**
Side	30	1	Alphanumeric	Corresponds to *Side* (54) in Bats FIX. 1 = Buy 2 = Sell 5 = Sell Short (client affirms ability to borrow) 6 = Sell Short Exempt
OrderQty	31	4	Binary	Corresponds to *OrderQty* (38) in Bats FIX. Number of shares for the order. System-wide limit is 999,999 shares.

<table>
<tr><td>NewOrder
Bitfield1</td><td>35</td><td>1</td><td>Binary</td><td>Bitfield indicating order fields to follow.
Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>ClearingFirm</td></tr><tr><td>2</td><td>ClearingAccount</td></tr><tr><td>4</td><td>Price</td></tr><tr><td>8</td><td>ExecInst</td></tr><tr><td>16</td><td>OrdType</td></tr><tr><td>32</td><td>TimeInForce</td></tr><tr><td>64</td><td>MinQty</td></tr><tr><td>128</td><td>MaxFloor</td></tr></table></td></tr>
<tr><td>NewOrder
Bitfield2</td><td>36</td><td>1</td><td>Binary</td><td>Bitfield indicating order fields to follow.
Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Symbol</td></tr><tr><td>2</td><td>SymbolSfx</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr><tr><td>64</td><td>Capacity</td></tr><tr><td>128</td><td>RoutingInst</td></tr></table></td></tr>
<tr><td>NewOrder
Bitfield3</td><td>37</td><td>1</td><td>Binary</td><td>Bitfield indicating order fields to follow.
Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Account</td></tr><tr><td>2</td><td>DisplayIndicator</td></tr><tr><td>4</td><td>MaxRemovePct</td></tr><tr><td>8</td><td>Discretion Amount</td></tr><tr><td>16</td><td>PegDifference</td></tr><tr><td>32</td><td>Prevent Member Match</td></tr><tr><td>64</td><td>LocateReqd</td></tr><tr><td>128</td><td>ExpireTime</td></tr></table></td></tr>
<tr><td>NewOrder
Bitfield4</td><td>38</td><td>1</td><td>Binary</td><td>Bitfield indicating order fields to follow.
Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>RESERVED</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr><tr><td>64</td><td>RESERVED</td></tr></table>
Bit 8 must be set to 0. It is reserved for future expansion.</td></tr>
</table>

<table>
<tr><td>NewOrder Bitfield5</td><td>39</td><td>1</td><td>Binary</td><td>Bitfield indicating order fields to follow. Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>RESERVED</td></tr><tr><td>2</td><td>AttributedQuote</td></tr><tr><td>4</td><td>RESERVED</td></tr></table>
Bits 4-8 must be set to 0. They are reserved for future expansion.</td></tr>
<tr><td>NewOrder Bitfield6</td><td>40</td><td>1</td><td>Binary</td><td>All bits must be set to 0. This field is reserved for future expansion.</td></tr>
<tr><td>Optional fields…</td><td></td><td></td><td></td><td></td></tr>
</table>

Required Order Attributes:
The following are required to be sent on new orders for instruments traded on Bats:

- some form of symbology (see **Symbology** below).
- a *Price* only (limit orders) or a *Price* and/or *OrdType* (limit, market, or peg orders).
- *Capacity.*

All other values have defaults. See the table in the **List of Optional Fields** section for additional information about each optional field, including its default value.

Symbology:
For Bats US Equities symbology, please refer to the Bats Symbology Reference document.

Example New Order Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	4C 00	76 bytes
MessageType	04	New Order
MatchingUnit	00	Always 0 for inbound messages
SequenceNumber	64 00 00 00	Sequence Number 100
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
Side	31	Buy
OrderQty	E8 03 00 00	1000 shares
NewOrderBitfield1	04	*Price*
NewOrderBitfield2	C1	*Symbol, Capacity, RoutingInst*
NewOrderBitfield3	01	*Account*
NewOrderBitfield4	00	No optional fields
NewOrderBitfield5	00	No optional fields
NewOrderBitfield6	00	No optional fields
Price	5C 13 04 00 00 00 00 00	26.71
Symbol	4D 53 46 54 00 00 00 00	MSFT
Capacity	50	P = Principal
RoutingInst	52 00 00 00	R = Routable
Account	44 45 46 47 00 00 00 00 00 00 00 00 00 00 00 00	DEFG

4.1.2 Cancel Order

Request to cancel an order using the *ClOrdID* from a previous order.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x05
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Bats) messages.
SequenceNumber	6	4	Binary	The sequence number for this message..
OrigClOrdID	10	20	Text	Corresponds to *OrigClOrdID* (41) in Bats FIX. ClOrdID of the order to cancel.
CancelOrder Bitfield1	30	1	Binary	Bitfield indicating cancel fields to follow. Logical OR to include multiple fields. **Value** / **Name** 1 – *ClearingFirm* 2 – *RESERVED* 4 – *RESERVED* 8 – *RESERVED* *ClearingFirm* is required for Service Bureau ports. Bits 5-8 *must* be set to 0. They are reserved for future expansion.
CancelOrder Bitfield2	31	1	Binary	All bits *must* be set to 0. This field is reserved for future expansion.
Optional fields…				

Example Cancel Order Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	26 00	38 bytes
MessageType	05	Cancel Order
MatchingUnit	00	Always 0 for inbound messages
SequenceNumber	64 00 00 00	Sequence Number 100
OrigClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
CancelOrder Bitfield1	01	*ClearingFirm*
CancelOrder Bitfield2	00	(empty)
ClearingFirm	54 45 53 54	TEST

4.1.3 Modify Order

Request to modify an order. The order attributes to be modified are specified using *ModifyOrderBitfieldOne* and *ModifyOrderBitfieldTwo*.

Only *Price, Side, OrderQty, and OrdType* may be adjusted. Any change in *Price* or any increase in *OrderQty* will result in the order losing its time priority. *OrdType* may be adjusted from Limit to Market (but not from Limit to Peg or Peg to Limit). *Side* may only be used to change an order from a short sell to a long sell or vice versa. Modification of *Side* will only result in loss of priority if *Side* is changing to/from a short sell **AND** the *Symbol* is in a Regulation SHO Short Sale Circuit Breaker.

Other fields (including ExecInst) **will be ignored,** and the value from the original order will be re-used. In particular note that when a Day-ISO is modified the ISO designation is applied to the new order.

Changes in *OrderQty* result in an adjustment of the current order's *OrderQty*. The new *OrderQty* does not directly replace the current order's *LeavesQty*. Rather a delta is computed from the current *OrderQty* and the replacement *OrderQty*. This delta is then applied to the current *LeavesQty*. If the resulting *LeavesQty* is less than or equal to zero, the order is cancelled. This results in safer behavior when the replace request overlaps partial fills for the current order, leaving the Member in total control of the share exposure of the order.

MaxFloor and *DiscretionAmount* are preserved from the original order and applied to the new size and price.

A `Modify Order` should not be issued until the `Order Modified` message for the previous `Modify Order` has been received for that order. The BOE handler will reject a new `Modify Order` if it has not seen the prior `Modify Order` from the Matching Engine.

`Modify Order` requests that merely reduce *OrderQty* may be overlapped if the existing *ClOrdID* is re-used. This is the only case where re-use of the existing *ClOrdID* is allowed.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x06
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Bats) messages.
SequenceNumber	6	4	Binary	The sequence number for this message..
ClOrdID	10	20	Text	New *ClOrdID* for this order.

<table>
<tr><td>OrigClOrdID</td><td>30</td><td>20</td><td>Text</td><td>Corresponds to OrigClOrdID (41) in Bats FIX.

ClOrdID of the order to replace.

In the case of multiple changes to a single order, this will be the ClOrdID of the most recently accepted change.</td></tr>
<tr><td>ModifyOrder Bitfield1</td><td>50</td><td>1</td><td>Binary</td><td>Bitfield indicating order modify fields to follow. Logical OR to include multiple fields.

<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>ClearingFirm</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>OrderQty</td></tr>
<tr><td>8</td><td>Price</td></tr>
<tr><td>16</td><td>OrdType</td></tr>
<tr><td>32</td><td>CancelOrig OnReject</td></tr>
<tr><td>64</td><td>ExecInst</td></tr>
<tr><td>128</td><td>Side</td></tr>
</table>
OrderQty must be present on all <code>Modify Order</code> requests. <code>Modify Order</code> messages without OrderQty will be rejected.

Price must now be present on all <code>Modify Order</code> requests for limit orders. <code>Modify Order</code> messages without Price will be rejected.

ClearingFirm is required for Service Bureau ports.</td></tr>
<tr><td>ModifyOrder Bitfield2</td><td>51</td><td>1</td><td>Binary</td><td>All bits must be set to 0. This field is reserved for future expansion.</td></tr>
<tr><td>Optional fields…</td><td></td><td></td><td></td><td></td></tr>
</table>

Example Modify Order Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	3E 00	62 bytes
MessageType	06	Modify Order
MatchingUnit	00	Always 0 for inbound messages
SequenceNumber	64 00 00 00	Sequence Number 100
ClOrdID	41 42 43 31 32 34 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC124
OrigClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
ModifyOrder Bitfield1	0C	*OrderQty*, *Price*
ModifyOrder Bitfield2	00	(empty)
OrderQty	E0 2E 00 00	12,000 shares
Price	3A E2 01 00 00 00 00 00	12.345

4.2 Bats to Member

4.2.1 Order Acknowledgement

`Order Acknowledgement` messages are sent in response to a `New Order` message. The message corresponds to a FIX Execution Report with *ExecType* (150) = 0 (New).

Per the instructions given in the `Login Request`, optional fields may be appended to echo back information provided in the original `New Order` message. Fields which have been requested to be echoed back, but which were not filled in will still be sent and will be filled with binary zero (0x00).

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x0A
MatchingUnit	5	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH.
SequenceNumber	6	4	Binary	The sequence number for this message. Distinct per matching unit.
TransactionTime	10	8	DateTime	The time the event occurred in the Bats matching engine (not the time the message was sent).
ClOrdID	18	20	Text	Echoed back from the original `New Order` message.
OrderID	38	8	Binary	Corresponds to *OrderID* (37) in Bats FIX. Order identifier supplied by Bats. This identifier corresponds to the identifiers used in Bats market data products.

<table>
<tr>
<td>Order Acknowledgement Bitfields</td>
<td>46</td>
<td>7</td>
<td>Binary</td>
<td>Bitfields indicating message fields to follow. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Side</td></tr>
<tr><td>2</td><td>PegDifference</td></tr>
<tr><td>4</td><td>Price</td></tr>
<tr><td>8</td><td>ExecInst</td></tr>
<tr><td>16</td><td>OrdType</td></tr>
<tr><td>32</td><td>TimeInForce</td></tr>
<tr><td>64</td><td>MinQty</td></tr>
<tr><td>128</td><td>MaxRemovePct</td></tr>
</table>
</td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Symbol</td></tr>
<tr><td>2</td><td>SymbolSfx</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
<tr><td>64</td><td>Capacity</td></tr>
<tr><td>128</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Account</td></tr>
<tr><td>2</td><td>ClearingFirm</td></tr>
<tr><td>4</td><td>ClearingAccount</td></tr>
<tr><td>8</td><td>DisplayIndicator</td></tr>
<tr><td>16</td><td>MaxFloor</td></tr>
<tr><td>32</td><td>DiscretionAmount</td></tr>
<tr><td>64</td><td>OrderQty</td></tr>
<tr><td>128</td><td>PreventMember Match</td></tr>
</table>
</td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>RESERVED</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>ReturnBitfield5</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>OrigClOrdID</td></tr>
<tr><td>2</td><td>LeavesQty</td></tr>
<tr><td>4</td><td>LastShares</td></tr>
<tr><td>8</td><td>LastPx</td></tr>
<tr><td>16</td><td>DisplayPrice</td></tr>
<tr><td>32</td><td>WorkingPrice</td></tr>
<tr><td>64</td><td>BaseLiquidity Indicator</td></tr>
<tr><td>128</td><td>ExpireTime</td></tr>
</table>
</td></tr>
</table>
</td>
</tr>
</table>

				5 *ReturnBitfield6* **Value** / **Name**: 1 *SecondaryOrderID*; 2 *RESERVED*; 4 *RESERVED*; 8 *AttributedQuote* 6 *ReturnBitfield7* **Value** / **Name**: 1 *SubLiquidityIndicator*
Reserved	53	1	Binary	Reserved For Bats Internal Use
Optional Fields…				

Example Order Acknowledgement Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	44 00	68 bytes
MessageType	0A	Order Acknowledgement
MatchingUnit	03	Matching Unit 3
SequenceNumber	64 00 00 00	Sequence Number 100
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
OrderID	05 10 1E B7 5E 39 2F 02	171WC1000005 (base 36)
Order Acknowledgement Bitfields	00 01 06 00 00 00 00	01 = *Symbol* 06 = *ClearingFirm*, *ClearingAccount*
Bats Internal	00	
Symbol	4D 53 46 54 00 00 00 00	MSFT
ClearingFirm	54 45 53 54	TEST
ClearingAccount	00 00 00 00	(empty)

Minimal Order Acknowledgement Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	34 00	52 bytes
MessageType	0A	Order Acknowledgement
MatchingUnit	03	Matching Unit 3
SequenceNumber	64 00 00 00	Sequence Number 100
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
OrderID	05 10 1E B7 5E 39 2F 02	171WC1000005 (base 36)
Order Acknowledgement Bitfields	00 00 00 00 00 00 00	No optional fields
Bats Internal	00	

4.2.2 Order Rejected

`Order Rejected` messages are sent in response to a `New Order` which must be rejected. This message corresponds to a FIX Execution Report with *ExecType* (150) = 8 (Rejected). `Order Rejected` messages are unsequenced.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x0B
MatchingUnit	5	1	Binary	Unsequenced application message. Matching unit will be set to 0.
SequenceNumber	6	4	Binary	Unsequenced application message. Sequence number will be set to 0.
TransactionTime	10	8	DateTime	The time the event occurred in the Bats matching engine (not the time the message was sent).
ClOrdID	18	20	Text	Echoed back from the original `New Order` message.
OrderRejectReason	38	1	Text	Reason for an order rejection. A = Admin C = Capacity Undefined D = Duplicate *ClOrdID* H = Halted I = Incorrect Data Center K = Order Rate Threshold Exceeded L = Order would lock or cross NBBO N = Ran Out of Liquidity to Execute Against O = *ClOrdID* Doesn't Match a Known Order P = Can't Modify an Order That is Pending

<table>
<tr><td></td><td></td><td></td><td></td><td>Fill
Q = Waiting For First Trade
R = Routing Unavailable
U = User Requested
V = Would Wash
W = Add Liquidity Only Order Would Remove
X = Order Expired
Y = Symbol Not Supported/NBBO Unknown
Z = Unforeseen Reason
m = Market Access Risk Limit Exceeded
o = Max Open Orders Count Exceeded
r = Reserve Reload
s = Symbol Level Risk Management
u = Order would cross LULD Price Bands
x = Crossed Market
y = Order received by Bats during replay</td></tr>
<tr><td>Text</td><td>39</td><td>60</td><td>Text</td><td>Human readable text with more information about the reject reason.</td></tr>
<tr><td>Order Rejected Bitfields</td><td>99</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to follow. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Side</td></tr><tr><td>2</td><td>PegDifference</td></tr><tr><td>4</td><td>Price</td></tr><tr><td>8</td><td>ExecInst</td></tr><tr><td>16</td><td>OrdType</td></tr><tr><td>32</td><td>TimeInForce</td></tr><tr><td>64</td><td>MinQty</td></tr><tr><td>128</td><td>MaxRemovePct</td></tr></table></td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Symbol</td></tr><tr><td>2</td><td>SymbolSfx</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr><tr><td>64</td><td>Capacity</td></tr><tr><td>128</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Account</td></tr><tr><td>2</td><td>ClearingFirm</td></tr><tr><td>4</td><td>ClearingAccount</td></tr><tr><td>8</td><td>DisplayIndicator</td></tr><tr><td>16</td><td>MaxFloor</td></tr><tr><td>32</td><td>DiscretionAmount</td></tr><tr><td>64</td><td>OrderQty</td></tr><tr><td>128</td><td>PreventMember Match</td></tr></table></td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td>3</td><td>ReturnBitfield4</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>RESERVED</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr></table></td></tr>
<tr><td></td><td></td><td></td><td></td><td>4</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td></td><td></td><td></td><td></td><td>5</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td></td><td></td><td></td><td></td><td>6</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>Reserved</td><td>106</td><td>1</td><td>Binary</td><td colspan="3">Reserved For Bats Internal Use</td></tr>
<tr><td>Optional Fields…</td><td></td><td></td><td></td><td colspan="3"></td></tr>
</table>

Example Order Rejected Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	79 00	121 bytes
MessageType	0B	Order Rejected
MatchingUnit	00	Unsequenced Message, unit = 0
SequenceNumber	00 00 00 00	Unsequenced Message, seq. = 0
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
OrderReject Reason	44	D
Text	44 75 70 6C 69 63 61 74 65 20 43 6C 4F 72 64 49 44 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	Duplicate ClOrdID
OrderRejected Bitfields	00 01 06 00 00 00 00	01 = *Symbol* 06 = *ClearingFirm*, *ClearingAccount*
Bats Internal	00	
Symbol	4D 53 46 54 00 00 00 00	MSFT
ClearingFirm	54 45 53 54	TEST
ClearingAccount	00 00 00 00	(empty)

4.2.3 Order Modified

`Order Modified` messages are sent in response to a `Modify Order` request to indicate that the order has been successfully modified.

Note: It is highly advised that all Members opt-in to receiving *LeavesQty* on `Order Modified` messages. In certain cases, the last message to be received on an order's lifecycle will be an `Order Modified` message. In such cases, to know the order is no longer live you must inspect *LeavesQty.* An example of this behavior would be modification of an order whilst an execution is being generated, resulting in the order being reduced to zero outstanding shares.

To maintain compatibility with Members who have already implemented BOE, this field will remain in the optional block.

<table>
<tr><th>Field</th><th>Offset</th><th>Length</th><th>Data Type</th><th>Description</th></tr>
<tr><td>StartOfMessage</td><td>0</td><td>2</td><td>Binary</td><td>Must be 0xBA 0xBA.</td></tr>
<tr><td>MessageLength</td><td>2</td><td>2</td><td>Binary</td><td>Number of bytes for the message, including this field but not including the two bytes for the StartOfMessage field.</td></tr>
<tr><td>MessageType</td><td>4</td><td>1</td><td>Binary</td><td>0x0C</td></tr>
<tr><td>MatchingUnit</td><td>5</td><td>1</td><td>Binary</td><td>The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH.</td></tr>
<tr><td>SequenceNumber</td><td>6</td><td>4</td><td>Binary</td><td>The sequence number for this message. Distinct per matching unit.</td></tr>
<tr><td>TransactionTime</td><td>10</td><td>8</td><td>DateTime</td><td>The time the event occurred in the Bats matching engine (not the time the message was sent).</td></tr>
<tr><td>ClOrdID</td><td>18</td><td>20</td><td>Text</td><td>Client order ID. This is the ClOrdID from the <code>Modify Order</code> message.</td></tr>
<tr><td>OrderID</td><td>38</td><td>8</td><td>Binary</td><td>Corresponds to OrderID (37) in Bats FIX.

The unique OrderID. Modifications do not change the OrderID.</td></tr>
<tr><td>Order Modified Bitfields</td><td>46</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to follow. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Side</td></tr><tr><td>2</td><td>PegDifference</td></tr><tr><td>4</td><td>Price</td></tr><tr><td>8</td><td>ExecInst</td></tr><tr><td>16</td><td>OrdType</td></tr><tr><td>32</td><td>TimeInForce</td></tr><tr><td>64</td><td>MinQty</td></tr><tr><td>128</td><td>MaxRemovePct</td></tr></table></td></tr>
<tr><td>1</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Account</td></tr><tr><td>2</td><td>ClearingFirm</td></tr><tr><td>4</td><td>ClearingAccount</td></tr><tr><td>8</td><td>DisplayIndicator</td></tr><tr><td>16</td><td>MaxFloor</td></tr><tr><td>32</td><td>DiscretionAmount</td></tr><tr><td>64</td><td>OrderQty</td></tr><tr><td>128</td><td>PreventMember Match</td></tr></table></td></tr>
<tr><td>3</td><td></td><td>Reserved For Future Use</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>4</td><td>ReturnBitfield5</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>OrigClOrdID</td></tr>
<tr><td>2</td><td>LeavesQty</td></tr>
<tr><td>4</td><td>LastShares</td></tr>
<tr><td>8</td><td>LastPx</td></tr>
<tr><td>16</td><td>DisplayPrice</td></tr>
<tr><td>32</td><td>WorkingPrice</td></tr>
<tr><td>64</td><td>BaseLiquidity Indicator</td></tr>
<tr><td>128</td><td>ExpireTime</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>ReturnBitfield6</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>SecondaryOrderID</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>AttributedQuote</td></tr>
</table>
</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table>
</td></tr>
<tr><td>Reserved</td><td>53</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
<tr><td>Optional Fields…</td><td></td><td></td><td></td><td></td></tr>
</table>

Example Order Modified Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	4C 00	76 bytes
MessageType	0C	Order Modified
MatchingUnit	03	Matching Unit 3
SequenceNumber	64 00 00 00	Sequence Number 100
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
OrderID	05 10 1E B7 5E 39 2F 02	171WC1000005 (base 36)
OrderModified Bitfields	04 00 00 00 30 00 00	04 = *Price* 30 = *DisplayPrice*, *WorkingPrice*
Bats Internal	00	
Price	3A E2 01 00 00 00 00 00	12.345
DisplayPrice	3A E2 01 00 00 00 00 00	12.345
WorkingPrice	3A E2 01 00 00 00 00 00	12.345

4.2.4 Order Restated

`Order Restated` messages are sent to inform the Member that an order has been asynchronously modified for some reason without an explicit `Modify Order` request having been sent.

Some example (non-exhaustive) reasons for `Order Restated` messages being sent:

- A reserve (iceberg) order has been reloaded.
- An order's remaining quantity was decremented because of a prevented wash trade.
- A re-routableorder has returned to rest on the book after matching liquidity on another market.
- Resting order transitions from a liquidity adder to a liquidity remover or a routed order returns to the book. This can occur as a result of discretion, when a peg order moves into another order, or an orde returns from its initial route attempt.

Members should be prepared to accept and apply `Order Restated` messages for any reason.

The *OrderRestatedBitfield1* and *OrderRestatedBitfield2* fields indicate the characteristics of the order which have changed. Optional fields will be present at the end of the message with the new values.

Note: It is highly advised that all Members opt-in to receiving *LeavesQty* on `Order Restated` messages. In some cases, the last message to be received on an order's lifecycle will be an `Order Restated` message. In such cases, to know the order is no longer live you must inspect *LeavesQty.* An example of this behavior would be restatement of an order in certain cases due to *PreventMemberMatch* being set to 'd'.

To maintain compatibility with Members who have already implemented BOE, this field will remain in the optional block.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x0D
MatchingUnit	5	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH.
SequenceNumber	6	4	Binary	The sequence number for this message. Distinct per matching unit.
TransactionTime	10	8	DateTime	The time the event occurred in the Bats matching engine (not the time the message was sent).
ClOrdID	18	20	Text	Client order ID. For user modifies, this is the *ClOrdID* from the `Modify Order`

				message. For unsolicited modifications, the *ClOrdID* is the identifier from the open order.
OrderID	38	8	Binary	Corresponds to *OrderID* (37) in Bats FIX. The unique OrderID. For informational purposes only. Modifications do *not* change the OrderID.
Restatement Reason	46	1	Alphanumeric	The reason for this Order Restated message. L = Reload P = Repricing of Peg order Q = Liquidity Updated R = Reroute W = Wash P = Peg or Price-Sliding Re-Price Bats reserves the right to add new values as necessary without prior notice.

<table>
<tr>
<td>Order Restated Bitfields</td>
<td>47</td>
<td>7</td>
<td>Binary</td>
<td>Bitfields indicating message fields to follow. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Side</td></tr>
<tr><td>2</td><td>PegDifference</td></tr>
<tr><td>4</td><td>Price</td></tr>
<tr><td>8</td><td>ExecInst</td></tr>
<tr><td>16</td><td>OrdType</td></tr>
<tr><td>32</td><td>TimeInForce</td></tr>
<tr><td>64</td><td>MinQty</td></tr>
<tr><td>128</td><td>MaxRemovePct</td></tr>
</table>
</td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Symbol</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Account</td></tr>
<tr><td>2</td><td>ClearingFirm</td></tr>
<tr><td>4</td><td>ClearingAccount</td></tr>
<tr><td>8</td><td>DisplayIndicator</td></tr>
<tr><td>16</td><td>MaxFloor</td></tr>
<tr><td>32</td><td>DiscretionAmount</td></tr>
<tr><td>64</td><td>OrderQty</td></tr>
<tr><td>128</td><td>PreventMember Match</td></tr>
</table>
</td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>RESERVED</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>ReturnBitfield5</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>OrigClOrdID</td></tr>
<tr><td>2</td><td>LeavesQty</td></tr>
<tr><td>4</td><td>LastShares</td></tr>
<tr><td>8</td><td>LastPx</td></tr>
<tr><td>16</td><td>DisplayPrice</td></tr>
<tr><td>32</td><td>WorkingPrice</td></tr>
<tr><td>64</td><td>BaseLiquidity Indicator</td></tr>
<tr><td>128</td><td>ExpireTime</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>ReturnBitfield6</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>SecondaryOrderID</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>AttributedQuote</td></tr>
</table>
</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table>
</td>
</tr>
</table>

Reserved	54	1	Binary	Reserved For Bats Internal Use
Optional Fields…				

Example Order Restated Message for a reserve (iceberg) reload:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	3D 00	65 bytes
MessageType	0D	Order Restated
MatchingUnit	03	Matching Unit 3
SequenceNumber	64 00 00 00	Sequence Number 100
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
OrderID	05 10 1E B7 5E 39 2F 02	171WC1000005 (base 36)
Restatement Reason	4C	L = Reload
OrderRestated Bitfields	00 00 00 00 00 01 00	01 = *SecondaryOrderID*
Bats Internal	00	
SecondaryOrderID	0A 10 1E B7 5E 39 2F 02	171WC100000A (base 36)

4.2.5 User Modify Rejected

`User Modify Rejected` messages are sent in response to a `Modify Order` for an order which cannot be modified. `User Modify Rejected` messages are unsequenced.

This message corresponds to a FIX Execution Report with *MsgType* (35) = 9 (Order Cancel Reject) and *CxlRejResponseTo* (434) = 2 (Order Cancel/Replace Request).

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x0E
MatchingUnit	5	1	Binary	Unsequenced application message. Matching unit will be set to 0.
SequenceNumber	6	4	Binary	Unsequenced application message. Sequence number will be set to 0.
TransactionTime	10	8	DateTime	The time the event occurred in the Bats matching engine (not the time the message was sent).
ClOrdID	18	20	Text	The *ClOrdID* of the modify request which was rejected.
ModifyReject Reason	38	1	Text	Reason for a modify rejection. A = Admin D = Duplicate *ClOrdID* H = Halted I = Incorrect Data Center K = Order Rate Threshold Exceeded L = Order would lock or cross NBBO M = MaxSize Exceeded N = Ran Out of Liquidity to Execute Against O = *ClOrdID* Doesn't Match a Known Order P = Can't Modify an Order That is Pending Fill R = Routing Unavailable V = Would Wash W = Add Liquidity Only Order Would Remove X = Order Expired Y = *Symbol* Not Supported/NBBO Unknown Z = Unforeseen Reason m = Market Access Risk Limit Exceeded r = Reserve Reload x = Crossed Market y = Modify received by Bats during replay

<table>
<tr><td>Text</td><td>39</td><td>60</td><td>Text</td><td>Human readable text with more information about the reject reason.</td></tr>
<tr><td>User Modified Rejected Bitfields</td><td>99</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to follow. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>1</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>2</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>3</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>4</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>5</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table></td></tr>
<tr><td>Reserved</td><td>106</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
<tr><td>Optional Fields…</td><td></td><td></td><td></td><td></td></tr>
</table>

Example User Modify Rejected Message:

Field Name	**Hexadecimal**	**Notes**
StartOfMessage	BA BA	Start of message bytes.
MessageLength	69 00	105 bytes
MessageType	0E	User Modify Rejected
MatchingUnit	00	Unsequenced Message, unit = 0
SequenceNumber	00 00 00 00	Unsequenced Message, seq. = 0
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
ModifyReject Reason	50	Pending Fill
Text	50 65 6E 64 69 6E 67 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	Pending
UserModify RejectedBitfields	00 00 00 00 00 00 00	No optional fields
Bats Internal	00	

4.2.6 Order Cancelled

An order has been cancelled.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x0F
MatchingUnit	5	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH.
SequenceNumber	6	4	Binary	The sequence number for this message. Distinct per matching unit.
TransactionTime	10	8	DateTime	The time the event occurred in the Bats matching engine (not the time the message was sent).
ClOrdID	18	20	Text	The order which was cancelled.

<table>
<tr><td>Cancel Reason</td><td>38</td><td>1</td><td>Text</td><td>Reason for the order cancellation.
A = Admin
D = Duplicate ClOrdID
H = Halted
L = Order would lock or cross NBBO
N = Ran Out of Liquidity to Execute Against
R = Routing Unavailable
S = Short Sale Price Violation
T = Fill would trade-through NBBO
U = User Requested
V = Would Wash
W = Add Liquidity Only Order Would Remove
X = Order Expired
Y = Symbol Not Supported/NBBO Unknown
Z = Unforeseen Reason
m = Market Access Risk Limit Exceeded
s = Symbol Level Risk Management
u = Order would cross LULD Price Bands
w = Would Remove on Unslide
x = Crossed Market</td></tr>
<tr><td>Order Cancelled Bitfields</td><td>39</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to follow.
See the List of Return Bitfields section.

<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Side</td></tr>
</table>
</td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Symbol</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>Account</td></tr>
<tr><td>2</td><td>ClearingFirm</td></tr>
<tr><td>4</td><td>ClearingAccount</td></tr>
<tr><td>8</td><td>DisplayIndicator</td></tr>
<tr><td>16</td><td>MaxFloor</td></tr>
<tr><td>32</td><td>DiscretionAmount</td></tr>
<tr><td>64</td><td>OrderQty</td></tr>
<tr><td>128</td><td>PreventMember Match</td></tr>
</table>
</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>3</td><td>ReturnBitfield4</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>RESERVED</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
<tr><td>32</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>ReturnBitfield5</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>OrigClOrdID</td></tr>
<tr><td>2</td><td>LeavesQty</td></tr>
<tr><td>4</td><td>LastShares</td></tr>
<tr><td>8</td><td>LastPx</td></tr>
<tr><td>16</td><td>DisplayPrice</td></tr>
<tr><td>32</td><td>WorkingPrice</td></tr>
<tr><td>64</td><td>BaseLiquidity Indicator</td></tr>
<tr><td>128</td><td>ExpireTime</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>ReturnBitfield6</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>SecondaryOrderID</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>AttributedQuote</td></tr>
</table>
</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table>
</td></tr>
<tr><td>Reserved</td><td>46</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
<tr><td>Optional Fields…</td><td></td><td></td><td></td><td></td></tr>
</table>

Example Order Cancelled Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	49 00	73 bytes
MessageType	0F	Order Cancelled
MatchingUnit	03	Matching Unit 3
SequenceNumber	64 00 00 00	Sequence Number 100
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
Cancel Reason	55	U = User Requested
OrderCancelled Bitfields	00 00 06 00 01 00 00	06 = *ClearingFirm*, *ClearingAccount* 01 = *OrigClOrdID*
Bats Internal	00	
ClearingFirm	54 45 53 54	TEST
ClearingAccount	31 32 33 34	1234
ClOrdID	41 42 43 31 32 31 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC121

4.2.7 Cancel Rejected

A `Cancel Rejected` message is sent in response to a `Cancel Order` message to indicate that the cancellation cannot occur. `Cancel Rejected` messages are unsequenced.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x10
MatchingUnit	5	1	Binary	Unsequenced application message. Matching unit will be set to 0.
SequenceNumber	6	4	Binary	Unsequenced application message. Sequence number will be set to 0.
TransactionTime	10	8	DateTime	The time the event occurred in the Bats matching engine (not the time the message was sent).
ClOrdID	18	20	Text	The order whose cancel was rejected.
CancelReject Reason	38	1	Text	Reason for a cancel rejection. A = Admin I = Incorrect Data Center J = Too late to cancel P = Can't Modify an Order That is Pending Fill O = *ClOrdID* Doesn't Match a Known Order b = Broker Option m= Market Access Risk Limit Exceeded y = Cancel received by Bats during replay
Text	39	60	Text	Human readable text with more information about the reject reason.

<table>
<tr><td>Cancel Rejected Bitfields</td><td>99</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to follow. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>1</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>2</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td>
<table>
<tr><th>Value</th><th>Name</th></tr>
<tr><td>1</td><td>RESERVED</td></tr>
<tr><td>2</td><td>RESERVED</td></tr>
<tr><td>4</td><td>RESERVED</td></tr>
<tr><td>8</td><td>RESERVED</td></tr>
<tr><td>16</td><td>RESERVED</td></tr>
</table>
</td></tr>
<tr><td>4</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>5</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table>
</td></tr>
<tr><td>Reserved</td><td>106</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
<tr><td>Optional Fields…</td><td></td><td></td><td></td><td></td></tr>
</table>

Example Cancel Rejected Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	69 00	105 bytes
MessageType	10	Cancel Rejected
MatchingUnit	00	Unsequenced Message, unit = 0
SequenceNumber	00 00 00 00	Unsequenced Message, seq. = 0
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
CancelReject Reason	4A	J
Text	54 4F 4F 20 4C 41 54 45 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	TOO LATE
CancelRejected Bitfields	00 00 00 00 00 00 00	No optional fields
Bats Internal	00	

4.2.8 Order Execution

An `Order Execution` is sent for each fill on an order.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x11
MatchingUnit	5	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH.
SequenceNumber	6	4	Binary	The sequence number for this message. Distinct per matching unit.
TransactionTime	10	8	DateTime	The time the event occurred in the Bats matching engine (not the time the message was sent).
ClOrdID	18	20	Text	Order ID of the order receiving the execution.
ExecID	38	8	Binary	Corresponds to *ExecID* (17) in Bats FIX. Execution ID. Unique across all units on a given day. Note: *ExecID*s will be represented on ODROP, FIXDROP and standard DROP ports as base 36 ASCII. Example conversion: Decimal: 28294005440239 → Base 36: A1234B567 Decimal: 76335905726621 → Base 36: R248BC23H Decimal: 728557228187 → Base 36: 09AP05V2Z
LastShares	46	4	Binary	Corresponds to *LastShares* (32) in Bats FIX. Executed share quantity.
LastPx	50	8	Binary Price	Corresponds to *LastPx* (31) in Bats FIX. Price of this fill.
LeavesQty	58	4	Binary	Corresponds to *LeavesQty* (151) in Bats FIX. Quantity still open for further execution. Will be zero if order is dead.
BaseLiquidity Indicator	62	1	Alphanumeric	Indicates whether the trade added or removed liquidity, or was routed to another market. A = Added Liquidity R = Removed Liquidity X = Routed to Another Market C = BZX Auction Trade

SubLiquidity Indicator	63	1	Alphanumeric	Additional information about an execution. **Bats may add additional values without notice. Members must gracefully ignore unknown values.** ASCII NUL (0x00) = No Additional Information E = Trade added RPI liquidity H = Trade added hidden liquidity I = Trade added hidden liquidity that was price improved J = Execution from order that joined the NBBO S = Execution from order that set the NBBO V = Trade added visible liquidity that was price improved
AccessFee	64	8	Signed Binary Fee	Deprecated. Will be NULL (0x00) filled.
ContraBroker	72	4	Alphanumeric	Corresponds to *ContraBroker* (375) in Bats FIX. BATS = Bats BZX Exchange BYXX = Bats BYX Exchange INET = Routed to Nasdaq ARCA = Routed to NYSE ARCA AMEX = Routed to NYSE MKT BEX = Routed to Nasdaq BX CHX = Routed to Chicago EDGA = Routed to Bats EDGA Exchange EDGX = Routed to Bats EDGX Exchange NYSE = Routed to New York PSX = Routed to Nasdaq PSX NSX = Routed to NSX DRT = Routed to DRT Pool

<table>
<tr><td>Order Execution Bitfields</td><td>76</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to follow. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>ReturnBitfield1</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Side</td></tr><tr><td>2</td><td>PegDifference</td></tr><tr><td>4</td><td>Price</td></tr><tr><td>8</td><td>ExecInst</td></tr><tr><td>16</td><td>OrdType</td></tr><tr><td>32</td><td>TimeInForce</td></tr><tr><td>64</td><td>MinQty</td></tr><tr><td>128</td><td>MaxRemovePct</td></tr></table></td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Symbol</td></tr><tr><td>2</td><td>SymbolSfx</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr><tr><td>64</td><td>Capacity</td></tr><tr><td>128</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>2</td><td>ReturnBitfield3</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Account</td></tr><tr><td>2</td><td>ClearingFirm</td></tr><tr><td>4</td><td>ClearingAccount</td></tr><tr><td>8</td><td>DisplayIndicator</td></tr><tr><td>16</td><td>MaxFloor</td></tr><tr><td>32</td><td>DiscretionAmount</td></tr><tr><td>64</td><td>OrderQty</td></tr><tr><td>128</td><td>PreventMember Match</td></tr></table></td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>RESERVED</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>4</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>5</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table></td></tr>
<tr><td>Reserved</td><td>83</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
<tr><td>Optional Fields…</td><td></td><td></td><td></td><td></td></tr>
</table>

Example Order Execution Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	5E 00	94 bytes
MessageType	11	Order Execution
MatchingUnit	03	Matching Unit 3
SequenceNumber	64 00 00 00	Sequence Number 100
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
ExecID	01 F0 B7 D9 71 21 00 00	D19800001 (base 36)
LastShares	C4 09 00 00	2,500 shares
LastPx	3A E2 01 00 00 00 00 00	12.345
LeavesQty	DC 05 00 00	1,500 shares
BaseLiquidity Indicator	41	A = Added
SubLiquidity Indicator	48	H = Trade added hidden liquidity
AccessFee	00 00 00 00 00 00 00 00	deprecated field
ContraBroker	42 41 54 53	BATS
OrderExecution Bitfields	00 00 46 00 00 00 00	46 = *ClearingFirm*, *ClearingAccount*, *OrderQty*
Bats Internal	00	
ClearingFirm	54 45 53 54	TEST
ClearingAccount	31 32 33 34	1234
OrderQty	A0 0F 00 00	4,000 shares

4.2.9 Trade Cancel or Correct

Used to relay a trade which has been cancelled (busted) or corrected (price change only). The *CorrectedPrice* field will be set to 0 for cancelled trades and to the new trade price for corrected trades. `Trade Cancel or Correct` can be sent for same day as well as previous day trades.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x12
MatchingUnit	5	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH.
SequenceNumber	6	4	Binary	The sequence number for this message. Distinct per matching unit.
TransactionTime	10	8	DateTime	The time the event occurred in the Bats matching engine (not the time the message was sent).
ClOrdID	18	20	Text	*ClOrdID* of the order whose fill is being cancelled or corrected.
OrderID	38	8	Binary	Corresponds to *OrderID* (37) in Bats FIX. Order whose fill is being cancelled or corrected.
ExecRefID	46	8	Binary	Corresponds to *ExecRefID* (19) in Bats FIX. Refers to the ExecID of the fill being cancelled or corrected.
Side	54	1	Alphanumeric	Side of the order.
BaseLiquidity Indicator	55	1	Alphanumeric	Indicates whether the trade added or removed liquidity, or was routed to another market. A = Added Liquidity R = Removed Liquidity X = Routed to Another Market C = BZX Auction Trade
ClearingFirm	56	4	Alpha	
ClearingAccount	60	4	Text	Echoed from original order.
LastShares	64	4	Binary	Number of shares of the trade being cancelled.
LastPx	68	8	Binary Price	Price of the trade being cancelled.
CorrectedPrice	76	8	Binary Price	For trade corrections, this is the new trade price. For trade breaks, this is set to 0.
OrigTime	84	8	DateTime	Corresponds to *OrigTime* (42). The date and time of the original trade, in GMT.

<table>
<tr><td>Trade Cancel or Correct Bitfields</td><td>92</td><td>7</td><td>Binary</td><td>Bitfields indicating message fields to follow. See the List of Return Bitfields section.
<table>
<tr><th>Byte</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>1</td><td>ReturnBitfield2</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Symbol</td></tr><tr><td>2</td><td>SymbolSfx</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr><tr><td>64</td><td>Capacity</td></tr><tr><td>128</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>2</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>3</td><td>ReturnBitfield4</td><td><table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>RESERVED</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>4</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>5</td><td></td><td>Reserved For Future Use</td></tr>
<tr><td>6</td><td></td><td>Reserved For Future Use</td></tr>
</table></td></tr>
<tr><td>Reserved</td><td>99</td><td>1</td><td>Binary</td><td>Reserved For Bats Internal Use</td></tr>
<tr><td>Optional Fields…</td><td></td><td></td><td></td><td></td></tr>
</table>

Example Trade Cancel or Correct Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	6A 00	106 bytes
MessageType	12	Trade Cancel or Correct
MatchingUnit	03	Matching Unit 3
SequenceNumber	64 00 00 00	Sequence Number 100
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
OrderID	05 10 1E B7 5E 39 2F 02	171WC1000005 (base 36)
ExecRefID	01 F0 B7 D9 71 21 00 00	D19800001 (base 36)
Side	31	Buy
BaseLiquidity Indicator	41	A = Added
ClearingFirm	54 45 53 54	TEST
ClearingAccount	00 00 00 00	(empty)
LastShares	C4 09 00 00	2,500 shares
LastPx	5C 13 04 00 00 00 00 00	26.71
CorrectedPrice	00 00 00 00 00 00 00 00	0 (cancelled)
OrigTime	E0 BA 75 95 15 4C EB 11	1,291,209,373,757,324,000
Trade Cancel or Correct Bitfields	00 01 00 00 00 00 00	01 = *Symbol*
Bats Internal	00	
Symbol	4D 53 46 54 00 00 00 00	MSFT

5 Implementation Notes

5.1 Automatic Cancel on Disconnect Malfunction

All open orders for a Member will be cancelled automatically if no messages have been received from the Member for 5 seconds. This is done to prevent orders from being stuck in an unknown state in the event of telecommunications failure. `Order Cancelled` messages for the automatically cancelled orders are available upon reconnection. Members are responsible for rerouting orders to other market centers based on their business needs. This should be rare, but all open orders may also be cancelled in the event of a complete or partial system malfunction.

5.2 Access Fees Returned on Order Executions

The access fee associated with each fill is calculated to 5 decimals and returned on each order execution. Negative numbers indicate liquidity rebates. Members should program their systems to read, validate, and pass along this field in order to avoid making software changes to their systems when the Bats fee schedule changes. The sum of the access fees received during a month should equal the access fee charged or rebated on a Member's monthly bill, rounded to the nearest penny.

5.3 Service Bureau Configuration

ClearingFirm must be set on `New Order`, `Cancel Order` and `Modify Order` messages sent to Bats. Orders with an unknown *ClearingFirm* will be rejected. *ClOrdID* values are required to be unique only within a given *ClearingFirm*. Messages sent by Bats will echo back the *ClearingFirm* value. **Orders must be cancelled or modified using the same *ClearingFirm* as was sent on the Order.**

5.4 OATS Connection ID

The OATS technical spec as of 5/3/2011 for implementation on 10/3/2011 allows for an optional ‘connectionId’ field to be included in your OATS feeds for the purposes of improving your order ID uniqueness. When creating OATS rows related to your transmissions to Bats, Bats recommends populating the OATS ‘connectionId’ field with the *SessionSubId* field as it appears on the login request. Please note that this field is optional on your OATS rows, and Bats is not recommending a perspective that you do or do not populate the field. Also note that the while not enforced internally, the Bats spec does require that your client order ID be day-unique; Bats continues to recommend this as the best way to meet OATS’ day-unique order ID requirements.

5.5 OATS Exchange Participant ID (EPID)

While most Members should use *ClearingFirm* (FIX Tag 439) for their OATS EPID, Service Bureaus should use *OnBehalfOfCompId* (FIX Tag 115).

6 Drop Copies

Drop copies of BOE traffic are available. Execution only drop copies are available via legacy (fixed-width) drop and FIX drop based interfaces. Order-by-order drop copies are available via Order by Order FIX drop based interfaces.

6.1 Max Number of Hits

Bats has repurposed FIX Tag 1 on FIX Drop ports to allow Registered Market Makers utilizing the Bats Market Maker Quoter to actively monitor the number of hits the Market Maker has remaining before Bats will pull both sides of their automated quote. FIX Tag 1 on FIX Drop ports will be used to maintain a count of hits remaining for a given security for all Market Maker Quoter events.

In event of an execution, FIX Tag 1 should be monitored for a value of 0 as at that point the Market Makers quote will be pulled and the Market Maker will need to take appropriate action in order to continue to fulfill their quote obligations. This may involve contacting the Bats Trade Desk to re-establish their automated quote or the Market Maker may choose to start fulfilling their quote obligation on their own.

In the case where the **Max Quote** (refer to the Bats US Equities Market Maker Quoter Specification) parameter has not been defined for a registered security, a value of UNLIMITED will be displayed in FIX Tag 1.

7 Future Expansion

New message types may be added without notice.

New fields may be added without notice. For messages which specify optional fields with bitfields (e.g., `Order Acknowledgement`), expansion will use a bit which has been reserved for future expansion. For messages which do not use optional fields with bitfields (e.g., `Order Cancelled`), fields will be appended to the end of the message.

In Bats' certification environment, undocumented messages will intentionally be sent occasionally. Undocumented extra fields will also occasionally be sent. This will aid Members in ensuring that their decoders will cope with future protocol changes.

8 List of Return Bitfields

This section lists all return bitfields. Specified unused bits *must* be set to 0, as they are reserved for future expansion. Reserved bits not noted as being required to be set to 0 are used by another Bats trading platform and will be ignored. Bats reserves the right to add more bit fields as per new requirements.

<table>
<tr><th>Field</th><th>Length</th><th>Data Type</th><th>Description</th></tr>
<tr><td>Return Bitfield1</td><td>1</td><td>Binary</td><td>Bitfield indicating return fields to follow. Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Side</td></tr><tr><td>2</td><td>PegDifference</td></tr><tr><td>4</td><td>Price</td></tr><tr><td>8</td><td>ExecInst</td></tr><tr><td>16</td><td>OrdType</td></tr><tr><td>32</td><td>TimeInForce</td></tr><tr><td>64</td><td>MinQty</td></tr><tr><td>128</td><td>MaxRemovePct</td></tr></table></td></tr>
<tr><td>Return Bitfield2</td><td>1</td><td>Binary</td><td>Bitfield indicating return fields to follow. Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Symbol</td></tr><tr><td>2</td><td>SymbolSfx</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr><tr><td>64</td><td>Capacity</td></tr><tr><td>128</td><td>RESERVED</td></tr></table></td></tr>
<tr><td>Return Bitfield3</td><td>1</td><td>Binary</td><td>Bitfield indicating return fields to follow. Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>Account</td></tr><tr><td>2</td><td>ClearingFirm</td></tr><tr><td>4</td><td>ClearingAccount</td></tr><tr><td>8</td><td>DisplayIndicator</td></tr><tr><td>16</td><td>MaxFloor</td></tr><tr><td>32</td><td>Discretion Amount</td></tr><tr><td>64</td><td>OrderQty</td></tr><tr><td>128</td><td>Prevent Member Match</td></tr></table></td></tr>
</table>

<table>
<tr><td>Return Bitfield4</td><td>1</td><td>Binary</td><td>Bitfield indicating return fields to follow. Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>RESERVED</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>RESERVED</td></tr><tr><td>16</td><td>RESERVED</td></tr><tr><td>32</td><td>RESERVED</td></tr></table>
Bits 5-8 must be set to 0. They are reserved for future expansion.</td></tr>
<tr><td>Return Bitfield5</td><td>1</td><td>Binary</td><td>Bitfield indicating return fields to follow. Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>OrigClOrdID</td></tr><tr><td>2</td><td>LeavesQty</td></tr><tr><td>4</td><td>LastShares</td></tr><tr><td>8</td><td>LastPx</td></tr><tr><td>16</td><td>DisplayPrice</td></tr><tr><td>32</td><td>WorkingPrice</td></tr><tr><td>64</td><td>BaseLiquidity Indicator</td></tr><tr><td>128</td><td>ExpireTime</td></tr></table></td></tr>
<tr><td>Return Bitfield6</td><td>1</td><td>Binary</td><td>Bitfield indicating return fields to follow. Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>SecondaryOrderID</td></tr><tr><td>2</td><td>RESERVED</td></tr><tr><td>4</td><td>RESERVED</td></tr><tr><td>8</td><td>AttributedQuote</td></tr></table>
Bits 3-8 must be set to 0. They are reserved for future expansion.</td></tr>
<tr><td>Return Bitfield7</td><td>1</td><td>Binary</td><td>Bitfield indicating return fields to follow. Logical OR to include multiple fields.

<table><tr><th>Value</th><th>Name</th></tr><tr><td>1</td><td>SubLiquidityIndicator</td></tr></table>
Bits 2-8 must be set to 0. They are reserved for future expansion.</td></tr>
</table>

9 List of Optional Fields

This section lists all optional field types supported by all Bats trading platforms worldwide.

Field	Length	Data Type	Description
Account	16	Text	Corresponds to *Account* (1) in Bats FIX. Reflected back on execution reports associated with this order. Available via Standard FIX Drop on an opt-in basis at the port level. Available by default on Order by Order FIX Drop (Market Maker Quoter users should refer to the **Max Number of Hits** section). Not available via DROP.
AttributedQuote	1	Alphanumeric	Optional, allow for order to be attributed to firm's MPID in Bats market data feeds. The order may also be included within attributed summary information displays related to quote/trade information on the Bats web site. Must opt-in to support through Bats Trade Desk. N = Do not attribute firm MPID to this order. Y = Attribute firm MPID to this order.
BaseLiquidity Indicator	1	Alphanumeric	Indicates whether the trade added or removed liquidity, or was routed to another market. A = Added Liquidity R = Removed Liquidity X = Routed to Another Market C = BZX Auction Trade
CancelOrig OnReject	1	Alpha	Corresponds to *CancelOrigOnReject* (9619) in Bats FIX. Indicates handling of original order on failure to modify. N = Leave original order alone. Y = Cancel original order if modification fails.
Capacity	1	Alpha	Corresponds to *OrderCapacity* (47) in Bats FIX. A = Agency P = Principal R = Riskless

ClearingAccount	4	Text	Corresponds to *OnBehalfOfSubID* (116) and *ClearingAccount* (440) in Bats FIX. Supplemental identifier. Recorded and made available in execution reports. Available via Drop.
ClearingFirm	4	Alpha	Corresponds to *OnBehalfOfCompID* (115) and *ClearingFirm* (439) in Bats FIX. Firm that will clear trade. Must be allowed NSCC MPID.
DiscretionAmount	2	Binary	Corresponds to *DiscretionAmount* (9622) in Bats FIX. • Discretion is expressed in cents (i.e. 10 is $0.10) • Discretion is implicitly added to bid prices and subtracted from offer prices. • Order will be displayed at *Price* but can execute in the discretionary range. • A discretionary order will use the minimum of discretion amount to achieve execution. • The default is to apply no discretion. • Max discretion to apply to *Price* (positive value in the range of 0-99.99). *DiscretionAmount* does not mix with IOC, Post-Only.

DisplayIndicator	1	Alphanumeric	Corresponds to *DisplayIndicator* (9479) in Bats FIX. V = Default. As determined by port level setting (default to S) S = Display-Price Sliding (this is to override a opt-out of Display-Price Sliding at the port level) L = Display-Price Sliding, but reject if order crosses NBBO on entry M = Multiple Display-Price Sliding P = Price Adjust m = Multiple Price Adjust R = Reject the order if it cannot be booked and displayed without adjustment r = Hidden. Cancel back the order if it cannot be booked without adjustment. I = Invisible (implied on all Peg orders other than Market Maker Pegs) N = NoRescrapeAtLimit v = Visible Peg (Primary Peg Only) **Display-Price Sliding:** If the limit price of the unexecuted remainder of a day order does not lock or cross the NBBO then Bats books it as is. If the limit price does lock or cross the market Bats offers Display-Price Sliding. Display-Price Sliding permanently adjusts the booked price on entry to the strongest price that does not **cross** the NBBO. It will temporarily adjust the displayed price to the strongest price that does not **lock** the NBBO. When the NBBO widens, the display price will be readjusted to the booked price. The display price may be temporarily weaker than the booked price. Multiple Display-Price Sliding does not permanently adjust the booked price on entry, but allows for Display-Price slid orders to continue to have their display **and** booked prices adjusted towards their original limit price based on changes to the prevailing NBBO.

DisplayIndicator (*cont.*)			**NoRescrapeAtLimit:** Applicable only to Fully Routable IOC orders (RoutingInst = R and TimeInForce = 3). After walking the price down to the limit, there will be no final scrape at Bats and the cancel code will state X (Expired) rather than N (No Liquidity).
DisplayPrice	8	Binary Price	Only present when order is fully or partially booked. If order had to be temporarily displayed at a less aggressive value to avoid locking the NBBO, then displayed price will be reported here, otherwise equals working price.
ExecInst	1	Text	Corresponds to ExecInst (18) in Bats FIX. f = Intermarket Sweep (Directed or Bats) r = Late (For use with Auction Only orders only. Refer to the Bats US Equities Auction Process specification for more information.) u = Bats + DRT (access liquidity on the Bats book, then route to DRT Dark Liquidity Partners (DLPs), then return to Bats order book or be cancelled depending on user's instructions) v = Force DRT (to override a port-level opt-out of DRT) w = Do not DRT (default is to DRT unless overridden at port level) P = Market Peg (peg Buy to NBBO Offer, peg Sell to NBBO Bid) Q = Market Maker Peg (see below) R = Primary Peg (peg Buy to NBBO Bid, peg Sell to NBBO Offer) U = Supplemental Peg Order M = Midpoint (peg to NBBO Midpoint) m = Midpoint (peg to NBBO Midpoint, but do not match in event the NBBO locks) L = Alternative Midpoint (less aggressive of midpoint and 1 tick inside NBBO) ASCII NULL (0x00) = no special handling Peg Orders: Midpoint Pegged orders (M, m and L) will be forced to hidden (*DisplayIndicator* = I), regardless of what is sent in the *DisplayIndicator* field. Only Hidden Market Pegs (*DisplayIndicator* = I) will be accepted at this time. If *DisplayIndicator* = V, then Primary/Market Peg order will be rejected. If *DisplayIndicator* is not sent, *DisplayIndicator* = I will be implied. Visible Primary pegs can be specified using *DisplayIndicator* = "v".

ExecInst *(cont.)*			Market Maker Pegs will peg at an offset of a defined Reference Price (see Bats Market Maker Specification). *OrdType* = "P" and *RoutingInst* = "P" are required. If not sent, *DisplayIndicator* will use the default setting defined on the port; orders with *DisplayIndicator* = "I" will be rejected. Routable Orders: Bats + DRT (u) require *RoutingInst* = R in the 1st character position. Force DRT (v) requires RoutingInst ≠ "B" or "P". If the 1st character of *RoutingInst* = R or *ExecInst* is not specified, then Force DRT (v) will be implied.
ExpireTime	8	DateTime	Corresponds to *ExpireTime* (126) in FIX. Required for *TimeInForce* = 6 orders, specifies the date-time (in GMT) that the order expires.
LastPx	8	Binary Price	Corresponds to *LastPx* (31) in Bats FIX. Price of this fill.
LastShares	4	Binary	Corresponds to *LastShares* (32) in Bats FIX. Executed share quantity.
LeavesQty	4	Binary	Corresponds to *LeavesQty* (151) in Bats FIX. Quantity still open for further execution. Will be zero if order is dead.
LocateReqd	1	Alpha	Corresponds to *LocateReqd* (114) in Bats FIX. Optional, only processed for Sell Short and Sell Short Exempt. N = client affirms ability to borrow (Default) Y = client does not affirm ability to borrow (results in a reject) Default = N
MaxFloor	4	Binary	Corresponds to *MaxFloor* (111) in Bats FIX. Portion of *OrderQty* to display. The balance is reserve. 0 displays the entire quantity. The displayed quantity of each order at a price level is decremented first. When displayed quantity is fully decremented, it is reloaded up to *MaxFloor* from reserve. Default = 0

MaxRemovePct	1	Binary	Corresponds to MaxRemovePct (9618) in Bats FIX. For Post Only At Limit (RoutingInst = Q), what percentage of the order quantity which remains after price improvement may be removed at the limit. Must be 0 for non-Post Only At Limit orders.
MinQty	4	Binary	Corresponds to MinQty (110) in Bats FIX. Optional minimum fill quantity for Bats Only hidden or IOC orders. When removing liquidity, limits the minimum total fill size, which may be made up of several consecutive smaller fills. Ignored if order is not Bats Only hidden or IOC. Set to 0 to allow fills of any size. Default = 0
OrderQty	4	Binary	Corresponds to OrderQty (38) in Bats FIX. Number of shares for the order. System-wide limit is 999,999 shares.
OrdType	1	Alphanumeric	Corresponds to OrdType (40) in Bats FIX. 1 = Market 2 = Limit (Default) P = Pegged Pegged requires ExecInst be set to L, M, P, Q, or R. Market implies TimeInForce of DAY. Market DAY orders can post in LULD straddle state or for short sale orders during Reg SHO circuit breakers.
OrigClOrdID	20	Text	Corresponds to OrigClOrdID (41) in Bats FIX.

PegDifference	8	Signed Binary Price	Corresponds to PegDifference (211) in Bats FIX. Optional signed value up to four decimal places is added to the result of peg calculation. PegDifference is round (down for buy, up for sell) to fit the tick size. Must be ≥ 0 for sell orders. Must be ≤ 0 for buy orders. Must be zero for midpoint peg or non-pegged orders.
PreventMember Match	3	Alpha	Corresponds to PreventMemberMatch (7928) in Bats FIX. Three characters: 1st character – MTP Modifier: N = Cancel Newest O = Cancel Oldest B = Cancel Both S = Cancel Smallest D = Decrement Larger/Cancel Smaller d = Same as D above, but only decrement LeavesQty. Do not restate OrderQty. 2nd character - Unique ID Level: F = Prevent Match at BZX Exchange Member Level M = Prevent Match at MPID Level 3rd character - Trading Group ID (optional): Member specified alphanumeric value 0-9, A-Z, or a-z. The Unique ID Level (character 2) of both orders must match to prevent a trade. If specified on both orders, Trading Group ID (character 3) must match to prevent a trade. The MTP Modifier (character 1) of the inbound order will be honored, except that if the inbound order specifies Decrement and the resting order does not, and the resting order is larger, then both orders will be cancelled. This exception is to protect the order-entry software for the resting order from receiving an unexpected restatement message. If order-entry software is prepared to handle unexpected restatement messages, this exception may be overridden at the port level by requesting “Allow MTP Decrement Override" functionality.

PreventMemberMatch (*cont.*)			Users of MTP Modifier D or d AND users of "Allow MTP Decrement Override" functionality must be prepared to receive an Order Restated message that decrements LeavesQty (and also OrdQty for method D).
Price	8	Binary Price	Corresponds to Price (44) in Bats FIX. Limit price. Four implied decimal places.
RoutingInst	4	Text	1st character: Specifies the target destination. A = NYSE ARCA B = Bats BZX Exchange Only C = NSX D = EDGA G = EDGX J = Bats BYX Exchange - B2B K = Nasdaq BX M = Chicago N = NASDAQ P = Bats BZX Exchange Only Post Only (will reject rather than remove visible liquidity unless the value of price improvement associated with the execution equals or exceeds the sum of fees charged for the execution plus the value of the rebate that would have been provided if the order posted to the Bats book and provided liquidity) Q = Bats BZX Exchange Only Post Only At Limit (remove shares that improve upon limit price and up to MaxRemovePct of remaining OrdQty at limit price) R = Smart route to visible markets (default) U = NYSE MKT X = Nasdaq PSX Y = NYSE • Post Only does not mix with TimeInForce = 3. • Bats Only Post Only orders do not interact with hidden order on entry unless the value of price improvement associated with the execution equals or exceeds the sum of fees charged for the execution plus the value of the rebate that would have been provided if the order posted to the Bats book and provided liquidity. • Bats Only Post Only At Limit orders do not interact with hidden orders on entry at the stated limit price.

RoutingInst (Cont.)			2nd character: Only applicable when 1st is R, is used to enable/disable re-route on Lock/Cross: L = Super Aggressive. Allow for use of Parallel strategy up to limit or discretion price on entry and allow for re-route via Parallel strategy after the order has booked only if another market locks or crosses the limit or discretion price. C = Aggressive. Allow for the use of Parallel strategy up to the limit or discretion price on entry and allow for re-route via Parallel strategy after the order has booked only if another market crosses the limit or discretion price K = Super Aggressive When Odd Lot. Routable Order will be automatically assigned Super Aggressive status when it becomes an odd lot. N = Do not re-route. 3rd character: Only applicable if 1st is R, specifies the routing strategy: D = Parallel-D (default) R = TRIM r = TRIM- (do not scrape BZX book first*) P = TRIM2 p = TRIM2- (do not scrape BZX book first*) Q = TRIM3 q = TRIM3- (do not scrape BZX book first*) S = SLIM s = SLIM+ (route to BYX Exchange prior to scraping BZX Exchange book*) T = Parallel-T 2 = Parallel-2D * Unless Price Improvement is available. 4th character: Reserved for future use. In order to specify values for the 2nd and/or 3rd character, the prior character(s) MUST be populated with a valid value. If RouteInst is not specified, a default value of RND is implied (All Visible Markets/No re-route/Parallel-D). ASCII NULs (0x00) in 2nd, 3rd, or 4th character positions will imply the default value for their respective position.

RoutingInst (*cont.*)			As the default RouteInst value is subject to change with little or no notice, it is recommended you specify values for all 4 character positions if you wish to maintain maximum control of your routing decisions. For more information regarding the various routing strategies available on Bats, refer to http://www.batstrading.com/features/.
SecondaryOrderID	8	Binary	Corresponds to SecondaryOrderID (198) in Bats FIX. Denotes an alternative OrderID which is present on Bats market data feeds (for example, to hide that a reserve (ice-berg) order has reloaded or increased in size). Or, OrderID of the contra side of a prevented match.
Side	1	Alphanumeric	Corresponds to Side (54) in Bats FIX. 1 = Buy 2 = Sell 5 = Sell Short (client affirms ability to borrow) 6 = Sell Short Exempt
Symbol	8	Alphanumeric	Corresponds to Symbol (55) in Bats FIX. Uniform symbology identifier for the instrument.
SubLiquidity Indicator	1	Alphanumeric	Additional information about an execution. Bats may add additional values without notice. Members must gracefully ignore unknown values. ASCII NUL (0x00) = No Additional Information E = Trade added RPI liquidity H = Trade added hidden liquidity I = Trade added hidden liquidity that was price improved J = Execution from order that joined the NBBO S = Execution from order that set the NBBO V = Trade added visible liquidity that was price improved
SymbolSfx	8	Alphanumeric	Corresponds to SymbolSfx (65) in Bats FIX. CQS or CMS suffix, if used. Do not send SymbolSfx if using Bats format or if symbol does not have a suffix.

TimeInForce	1	Alphanumeric	Corresponds to TimeInForce (59) in FIX. 0 = DAY (Default) (Early Trading Session until end of Regular Session.) 1 = GTC (Allowed, but treated same as Day.) 2 = At the Open (Available on BZX Exchange and applicable to Bats-Listed Securities only.) 3 = IOC (Portion not filled immediately is cancelled.) 4 = FOK (An IOC where the entire size must be filled, else the order will be cancelled back.) 5 = GTX (Early Trading Session until end of Post-Market Session) 6 = GTD (Early Trading Session; expires at earlier of specified ExpireTime or end of Post-Market Session.) 7 = At the Close (Available on BZX Exchange and applicable to Bats Listed Securities only.) E = PRE (Pre-Market Trading Session until end of Regular Session.) *Effective 5/25/16* R = RHO (Regular Hours/Session Only). T = PTD (Pre-Market Trading Session; expires at earlier of specified ExpireTime or end of Post-Market Session.) *Effective 5/25/16* X = PTX (Pre-Market Trading Session until end of Post-Market Session.) *Effective 5/25/16*
WorkingPrice	8	Binary Price	Only present when order is fully or partially booked. If price had to be adjusted to a less aggressive value to avoid crossing the NBBO, the adjusted price will be reported here, otherwise equals price.

10 List of Message Types

10.1 Member to Bats

Message Name	Session/Application	Message Type	Sequenced
Login Request	Session	0x01	No
Logout Request	Session	0x02	No
Client Heartbeat	Session	0x03	No
New Order	Application	0x04	Yes
Cancel Order	Application	0x05	Yes
Modify Order	Application	0x06	Yes

10.2 Bats to Member

Message Name	Session/Application	Message Type	Sequenced
Login Response	Session	0x07	No
Logout	Session	0x08	No
Server Heartbeat	Session	0x09	No
Replay Complete	Session	0x13	No
Order Acknowledgement	Application	0x0A	Yes
Order Rejected	Application	0x0B	No
Order Modified	Application	0x0C	Yes
Order Restated	Application	0x0D	Yes
User Modify Rejected	Application	0x0E	No
Order Cancelled	Application	0x0F	Yes
Cancel Rejected	Application	0x10	No
Order Execution	Application	0x11	Yes
Trade Cancel or Correct	Application	0x12	Yes

11 Port Attributes

The table below lists BOE port attributes that are configurable on the port or firm level. Changes to these attributes can be made by entering a Logical Port Change Request via the BATS Member Web Portal.

Attribute	Default	Description
Allowed Clearing MPID(s)*	All MPIDs	Clearing MPID(s) allowed for trading on port.
Default Clearing MPID	None	Default MPID to use if none is sent on New Order.
Allow Pre-market*	Yes	Allows for orders to be entered prior to regular market open.
Allow Post-market*	Yes	Allows for orders to be entered after the regular market close.
Allow Short Sales*	Yes	Allows or disallows short sales.
Allow ISO*	Yes	Allows or disallows ISO orders.
Allow Directed ISO*	Yes	Allows or disallows ISO orders directed to other market centers.
Default Routing Instruction†	"RND"	Specifies a default value for *RoutingInst*.
Default Exec. Instruction†	None	Specifies a default value for *ExecInst*.
Maximum Order Size*	25,000	Maximum number of shares allowed per order.
Maximum Order Dollar Value*	Unlimited	Maximum order dollar value per order.
Default Price Sliding†	"S"	Default price sliding behavior. Specifies a default value for *DisplayIndicator*.
Default Pricing Sliding (Hidden Order Override)†	"S"	When a different default price sliding behavior is desired for hidden orders, this port attribute may be used. Specifies a default value for *DisplayIndicator*, but only for hidden orders.

Cancel on Disconnect	*Option #1*	Bats will offer Members 3 options for cancelling orders as a result of a session disconnect: 1. Cancel Continuous Book Orders Only (default) 2. Cancel All Open Orders (continuous books and On-Open, On-Close and Late orders)* 3. Do Not Cancel Any Open Orders **If disconnect occurs during the cut-off period for an auction, On-Open, On-Close and Late orders that are to participate in the auction will not be cancelled.*
Send Trade Breaks^	No	Enables `Trade Cancel or Correct` messages.
Default MTP Value*^†	None	Specifies Default value for *PreventMemberMatch*.
Allow MTP Decrement Override*^	No	Overrides the exception that requires both the resting and inbound order to be marked as "Decrement".
Allow Sponsored Participant MTP Control*^	No	Allows Sponsored Participant to override port default for MTP by using *PreventMemberMatch* on order-level.
Cancel on Reject†	No	Cancels an order upon a cancel or modify reject for that order.
Cancel on Halt	No	Cancel open orders for a symbol upon a halt.
Opt-out of PITCH Obfuscation	No	Opt-out all orders from PITCH Order Id obfuscation for hidden and reserve orders.
Decrement Remainder Only^	No	Enables "d" option for MTP. See *PreventMemberMatch* for details.
Fat Finger Protection*	None	Specifies a percentage or dollar based limit price tolerance where any orders entered with a limit price that is through the NBBO by an amount greater than or equal to the defined percentage or dollar amount will be rejected. Limits may be different for different price ranges. Does not apply to RHO orders entered prior to the open until they move to continuous trading. Please see the Web Portal Port Controls Specification for more details.
Reject Orders on DROP Port Disconnect*	No	Allows Member/Sponsoring Firms to associate a DROP port(s) to an order entry port(s). Once the association has been established and all DROP ports associated with a order entry port experience a session disconnect,

		reject orders on the order entry port until at least one of the DROP port sessions have been reestablished.
Reject Orders on DROP Port Timeout(s)*	30 sec	Only applicable for sessions where "Reject Orders on DROP Port Disconnect" has been enabled. When the last associated DROP port for the order entry session has disconnected, the reject/cancel actions will be taken on the order entry session if an associated DROP port has not reestablished its connection in the defined time. Minimum value allowed is 0.
Cancel Open Orders on DROP Port Disconnect*	No	Only applicable for sessions where "Reject Orders on DROP Port Disconnect" has been enabled. If all DROP ports associated with an order entry port become disconnected, cancel all open orders on the order entry port.
Notional Cutoff Aggregation Methods		Gross exposure = CBB + CBO + CEB + CEO. Net exposure = ABSOLUTE VALUE of [(CEO + CBO) – (CEB+CBB)] On a given port Bats will calculate and track four values as follows: ➢ **Cumulative Notional Booked Bid Value (CBB)** – The sum of limit price * size for all buy limit orders on the book. ➢ **Cumulative Notional Booked Offer Value (CBO)** – The sum of limit price * size for all sell limit orders on the book. ➢ **Cumulative Notional Executed Bid Value (CEB)** – The sum of size * trade price on all executed buy orders. ➢ **Cumulative Notional Executed Offer Value (CEO)** – The sum of size * trade price on all executed sell orders.
Gross Daily Risk Limit Order Notional Cutoff*	None	Optional parameter that if specified will result in rejects for **limit** orders when **gross** exposure of limit orders exceeds this value. Whole dollar value not to exceed $1B/port.
Gross Daily Risk Limit Order Notional Warn %	None	Optional parameter that will generate an email notification when the corresponding Cutoff risk limit exceeds a user defined percentage.

Gross Daily Risk Market Order Notional Cutoff*	None	Optional parameter that if specified will result in rejects for **market** orders when **gross** exposure of limit orders exceeds this value. Whole dollar value not to exceed $1B/port.
Gross Daily Risk Market Order Notional Warn %	None	Optional parameter that will generate an email notification when the corresponding Cutoff risk limit exceeds a user defined percentage.
Net Daily Risk Limit Order Notional Cutoff*	None	Optional parameter that if specified will result in rejects for **limit** orders when **net** exposure of limit orders exceeds this value. Whole dollar value not to exceed $1B/port.
Net Daily Risk Limit Order Notional Warn %	None	Optional parameter that will generate an email notification when the corresponding Cutoff risk limit exceeds a user defined percentage.
Net Daily Risk Market Order Notional Cutoff*	None	Optional parameter that if specified will result in rejects for **market** orders when **net** exposure of limit orders exceeds this value. Whole dollar value not to exceed $1B/port.
Net Daily Risk Market Order Notional Warn %	None	Optional parameter that will generate an email notification when the corresponding Cutoff risk limit exceeds a user defined percentage.
Default Attributed Quote*†	Never	Specifies a default value for *AttributedQuote*. May only override at order to level after executing Attribution Addendum to Exchange User Agreement. Once Addendum has been executed, may default to Yes or No through Bats Trade Desk.
Crossed Market Reject/Cancel	No	Reject new orders upon receipt when the NBBO in the subject security is crossed. Routable orders will have any remaining quantity cancelled back if the NBBO is crossed when the order returns to the Bats Book. Order modifications which cause a loss of priority (e.g. due to a price change or increase in size) will result in a cancel of the original order if the NBBO is crossed upon receipt of the modify instruction.
Send Peg Restatements	*Option #1*	Send order restatements for Peg order moves. 1. No Peg restatements (default) 2. Market Maker Peg orders only 3. All Peg orders except Market Maker Peg orders 4. All Peg orders
Single Order ADV Check*	None	Reject orders when order size exceeds a specified percentage of the 20-day ADV. Members may also

		specify a 20-day ADV amount below which the check will not be applied.
Duplicative Order Protection Time Threshold	None	Time window, in seconds, for Duplicative Order Protection check.
Duplicative Order Protection Order Count Threshold	None	Number of orders with the same *ClearingFirm*, *Price*, *OrdQty*, and *Symbol* that must be seen within the Duplicative Order Time Threshold to initiate Duplicative Order Protection Action.
Duplicative Order Protection Action	*Option #1*	Action taken when Duplicative Order Protection criteria is met. 1. Not enabled 2. Reject new orders for remainder of Duplicative Order Time Threshold Disable port for *ClearingFirm*. Must call Bats Trade Desk to re-enable.
All Routable To Halt Auction (BZX Only)	No	Send all routable orders to the halt auction on the primary listing exchange. This applies to all routing strategies.
Early Trading Session Opt-Out (*Effective 5/25/16*)	No	Allows for orders to be executable during the Early Trading Session (7:00 AM to 8:00 AM). If set to Yes, then the following TimeInForce (FIX Tag 59) values will be translated. • 0 (DAY) -> E (PRE) • 5 (GTX) -> X (PTX) 6 (GTD) -> T (PTD)

* Sponsored Participants require written approval from Sponsors to update these settings on ports associated to a Sponsor's MPID.
† Port attribute can be overridden via BOE on an order by order basis.
^ Requires certification.

Support

Please email questions or comments regarding this specification to tradedesk@bats.com.

Revision History

Document Version	Date	Description
1.0.0	07/07/11	Initial Version 1.0.0.
1.0.1	07/12/11	Added clarification to **Optional Fields and Bitfields** section.
1.0.2	07/15/11	Typo corrected for `LoginResponseStatus` message length.
1.1.0	07/21/11	Removed various references to flags used in other Bats markets. *DiscretionAmount* size changed from 8 to 2.
1.1.1	08/02/11	Removed *ClearingAccount* from `Cancel Order` and `Modify Order` input messages. It does not make sense to send this field on those message types. Added definition for *OrigClOrdID*, *LastShares*, *LastPx*, and *SecondaryOrderID* to **List of Optional Fields** section. *LocateReqd* is valid bitfield of *NewOrderBitfield3*.
1.1.2	08/05/11	Removed *LockedQty* references (Bats EU specific).
1.1.3	08/12/11	Added Symbol to *ReturnBitfield2* of `Order Restated` and `Order Cancelled` messages. Added Side to *ReturnBitfield1* of `Order Cancelled` messages. Add **Port Attributes** section. Added *LoginResponseStatus* Reason Code 'M = Invalid Login Request message structure'.
1.1.4	08/16/11	Added `Order Cancelled` *Cancel Reason* of 'T = Fill would trade-through NBBO'.
1.1.5	08/24/11	Highly recommend that Members request *LeavesQty* on `Order Modified` and `Order Restated` messages. Clarified it is necessary to send both *Price* and *OrderQty* on `Order Modify` messages. Changed *ClearingAccount* type from Alpha to Text field. Clarified valid values for *MaxRemovePct* when sending a routing value other than Q. Added `Order Cancelled` *Cancel Reason* 'W = Add Liquidity Only Order Would Remove'. Updated `Login Request and Login Response` examples. Added Reject Orders on DROP Port Timeout(s) and Cancel Open Orders on DROP Port Disconnect to **Port Attributes** section.
1.1.6	08/31/11	Added OATS Connection ID section.
1.1.7	09/14/11	Added *Subliquidity Indicator* "V" to `Executed Order` messages in support of Display-Price Sliding enhancement effective 09/23/11.

1.1.8	09/21/11	Added cancel and reject reason of "m" Market Access Risk Limit. Updated *ExecID* description to show that *ExecID* can be compared to ODROP, FIXDROP and DROP ExecIDs. Corrected description of Market Peg order.
1.2.0	10/21/11	Ammended Section 6 Drop Copies to reflect BOE support via Order by Order FIX DROP. Removed Europe-specific *RestatementReason* values. Updated bitfields on `Login Request` and `Login Response` messages for `Order Cancelled` and `Order Restated` messages. Updated `Order Modify` message to reflect that *ExecInst* cannot be changed with an `Order Modify`. Added *CancelReason* of "H" = Halted. Removed Default Auction Only to Late port attribute. Added *ExecInst* "r" = Late. Added "M" = MaxSize Exceeded to *ModifyRejectReason* values. Converted reserved 8th byte of all bitfield sets to a byte reserved for Bats internal use.
1.2.1	10/25/11	Enforce *Capacity* marking on `New Order` messages (effective date 11/11/11). Added *OrderRejectReason* of "C = Capacity Undefined" to `Order Rejected` message.
1.2.2	11/02/11	Added *ModifyRejectReason* of "m = Market Access Risk Limit Exceeded" to `Order Rejected` message. Corrected description of Reason Code "L" for `Order Canceled`,`Order Rejected, and Modify Rejected` messages. Undefined *NewOrderBitfields*, *ModifyOrderBitfields*, or *CancelOrderBitfields* within incoming messages (`New Order, Modify Order, Cancel Order`) will be rejected.
1.2.3	11/07/11	Added Notional Cutoff Aggregation Method, Limit Order Notional Cutoff, and Market Order Notional Cutoff to **Port Attributes** section.
1.2.4	12/08/11	Added Send Routing Instruction to **Port Attributes** section.
1.2.5	12/16/11	Added "o" = Max Open Orders Count Exceeded to *OrderRejectReason* values. Noted *Capacity* is required for `New Order`.
1.2.6	01/05/12	Added CancelReason of S = Short Sale Price Violation to Order Cancelled message.

		Added DisplayIndicator of "M" in support of Multiple Display-Price Sliding.
1.2.7	01/18/12	Updated Multiple Display-Price Sliding effective date pending SEC Approval.
1.2.8	01/30/12	Added TRIM2 (P), TRIM2- (p), TRIM3 (Q), TRIM3- (q) as Routing Strategies in 3rd character of RoutingInst.
1.3.0	02/01/12	Added option to allow for cancel of all open orders including auction only orders to Cancel On Disconnect in the Port Attributes section. Added support for using either Net, Gross, or a combination of both Notional Cutoff Aggregation Methods to the Port Attributes section. Effective 02/03/12. Removed Notional Cutoff Aggregation Method attribute and added specific attributes for both Gross and Net Daily Risk Limit/Market Cutoffs. Effective 02/03/12.
1.3.1	02/17/12	Clarified ExecInst defaults for Routeable Orders. Minor updates to Port Attributes section.
1.4.0	03/07/12	Added AttributedQuote. Effective 05/07/12.
1.4.1	03/08/12	Correction to AttributedQuote within the Login Request and Login Response. In the Order Acknowledgement Bitfields, Bitfield6, AttributedQuote has been moved from bit 1 to bit 4.
1.4.2	04/04/12	Remove support for RHO orders in Non-Bats Listed Securities.
1.4.3	04/25/12	Specified Value 32 of Return Bitfield 4 is Reserved.
1.4.4	05/17/12	Updated PreventMemberMatch tag 7928 to assign formerly reserved 3rd character to Trading Group Id. Effective 05/25/12. Changed NYSE AMEX references to NYSE MKT.
1.5.0	05/25/12	Post Only Orders will execute against resting orders if the value of price improvement associated with the execution equals or exceeds the sum of fees charged for the execution plus the value of the rebate that would have been provided if the order posted to the Bats book and subsequently provided liquidity. Effective 06/08/12
1.5.1	06/14/12	Clarified the cases in which SecondaryOrderID is sent. Removed Port Attributes that are not applicable to BOE.
1.5.2	06/19/12	Added reason code of 'x = Crossed Market' to OrderRejectReason, ModifyRejectReason and CancelReason. Added Crossed Market Reject/Cancel to Port Attributes section.

1.5.3	08/07/12	Removed Referece to TRAC and DATA as those ECNs have ceased operations. Added new RestatementReason of Q – Liquidity Updated, effective 08/17/12. Updated Multiple Display-Price Sliding effective date to 08/24.12
1.5.4	09/13/12	Clarification added to Order Restated message example.
1.5.5	09/26/12	*AttributedQuote* field was missing on the Bats to Member `Order Acknowledgement` messages.
1.5.6	01/31/13	Added 'u = Order would cross LULD Price Bands' to *CancelReason* and *OrderRejectReason* fields.
1.5.7	02/08/13	Clarified *DiscretionAmount* based on ability to use *DiscretionAmount* with directed orders.
1.6.0	02/11/13	Added Market Maker Peg order type *ExecInst (FIX Tag 18)* = Q, *OrdType (FIX Tag 40)* = P, *RoutingInst (FIX Tag 9303)* = P. Effective 03/15/13.
1.7.0	04/04/13	Added new *RestatementReason* = P and added Peg Restatements to **Port Attributes** section. Effective 05/17/13. Updated *AccessFee* definition.
1.7.1	04/05/13	Defined *SubLiquidityIndicator* Bitfield.
1.7.2	05/24/13	Removed *SubLiquidityIndicator* from `Order Modified` and `Order Restated` Messages. *SubLiquidityIndicator* was added to these message types in error.
1.7.3	05/30/13	Corrected effective date of *SubLiquidityIndicator* on `Order Acknowledged` message to 05/24/13.
1.8.0	07/10/13	CYCLE routing strategy, where 3rd character of *RoutingInst* = "C" to be deprecated in favor of Parallel routing strategies. Effective 09/03/13.
1.8.1	08/05/13	Market Maker Pegs orders sent with a *TimeInForce* = 5 or 6 (GTX or GTD) will be rejected.
1.8.2	09/27/13	Added 'J' value to *SubLiquidityIndicator* (execution from order that joined the NBBO). Added 'Y = *Symbol* Not Supported/NBBO Unknown' *CancelReason*.
1.8.3	12/10/13	Updated CYCLE routing strategy where 3rd character of *RoutingInst* (Tag 9303) = "C" will be rejected effective 01/02/14.
1.8.4	06/05/14	Added maximum of 20% for Fat Finger Percentage in **Port Attributes** section. CYCLE routing strategy removed. Removed references to NSX and CBSX. Added OATS EPID section.

1.8.5	07/31/14	Corrected ReturnBitfield6 on all applicable message types. Added MTP Modifier of Cancel Smallest, PreventMemberMatch (7928) = "S". Effective 08/22/14.
1.8.6	08/29/14	Added CancelReason = "w", Would Remove on Unslide. Added support for Aggressive/Super Aggressive re-route orders. Effective 09/12/14. Added support for Visible Peg Orders. Effective 09/12/14. Added support for defaulting Odd Lots to Super Aggressive re-route orders. Effective 09/12/14.
1.8.7	09/23/14	Added support for Supplemental Peg Orders, ExecInst (18) = "U". Effective 10/17/14. Added support for Price Adjust and Multiple Price Adjust, DisplayIndicator (9479) = "P" and "m" respectively. Effective 10/17/14. Added support for Hidden Cancel Back, DisplayIndicator (9479) ="r". Effective 10/03/14.
1.8.8	09/29/14	Added Cancel on Halt option to Port Attributes section due to new default queuing behavior being implemented for halts. Effective 12/01/14 (BYX) and 12/02/14 (BZX).
1.8.9	10/08/14	Market orders will be allowed to be non-IOC. Effective 11/14/14.
1.8.10	01/29/15	Removed references to Lava FLOW as their last day of trading is 1/30/15.
1.8.11	03/27/15	Deprecated AccessFee field. Effective 3/31/15. Added value of "s" to OrderReject Reason and CancelReason fields for duplicative order rejects.
1.8.12	08/05/15	Added values to RoutingInst and ContraBroker in anticipation of NSX reactivation on 8/31/15. Added Single Order ADV Check port attribute. Effective 8/14/15 Updated description of Fat Finger Protection port attribute.
1.8.13	08/21/15	Added *Duplicative Order Protection* port attributes.
1.9.0	02/19/16	Added Port Attribute "All Routable To Halt Auction". Bats branding/logo changes.
1.9.1	02/24/16	Updated reason code for *RestatementReason* Effective 3/10/16
1.9.2	03/24/16	Updated the minimum value of the "Reject Orders on DROP Port Timeout (s)*" Port Attribute. Effective 4/25/16
1.9.3	4/12/16	Added three new TimeInForce values to support addition of Early Trading Session. *Effective 5/25/16* Added Early Trading Session Opt-Out port attribute. *Effective 5/25/16*
1.9.4	4/27/16	Clarified when "Fat Finger Protection" is applied.

1.9.5	5/6/16	Added 4 “Warn %” Port Attributes which are associated with the “Daily Notional Cutoff” Port Attributes.